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Samuel Riddle

PRESIDENT
SAMUEL RIDDLE

VICE-PRESIDENT
LOUISVILLE RAILWAY COMPANY, INC.
LOUISVILLE, KY.

PROCEEDINGS
OF THE
AMERICAN ELECTRIC RAILWAY
TRANSPORTATION AND TRAFFIC
ASSOCIATION
1930

CONTAINING A COMPLETE REPORT
OF THE TWENTY-THIRD ANNUAL
CONVENTION, HELD AT THE FAIR-
MONT HOTEL, SAN FRANCISCO, CAL.,
JUNE 23 TO 26, 1930.

PUBLISHED BY THE
AMERICAN ELECTRIC RAILWAY ASSOCIATION
292 MADISON AVENUE
NEW YORK, N. Y.

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THE AMERICAN STREET AND INTERURBAN RAILWAY
TRANSPORTATION AND TRAFFIC ASSOCIATION

WAS ORGANIZED AT NEW YORK, N. Y., JANUARY 30, 1908

THE NAME OF THIS ASSOCIATION IS NOW
AMERICAN ELECTRIC RAILWAY TRANSPORTATION AND
TRAFFIC ASSOCIATION

(CHANGE MADE AT 1910 ATLANTIC CITY CONVENTION)

TABLE OF CONTENTS

	PAGE
Officers, Ex Comm., 1929-1930 (of the 1930 Convention)	iv
Officers, Ex. Comm., 1930-1931 (elected at the 1930 Convention) .	v
Personnel of Committees, 1929-1930	vi
Convention Program, 1930	vii
Minutes of Monday's Session (June 23, 1930):	
Address of the President	1
Report of the Executive Committee	3
Report of the Secretary-Treasurer	9
Report of the Committee on Nominations	11
Election of Officers	12
Report of the Committee on The Transportation Employee	12
Discussion by:	
Henry H. Norris	19
A. T. Mercier	21
General Discussion	23
Report of the Committee on The Movement of the Vehicle	27
Discussion by:	
E. S. McIlraith	63
A. S. Lundberg	77
Minutes of Tuesday's Luncheon Session (June 24, 1930):	
Report of the Committee on Small City Operation	81
Discussion by F. L. Butler	85
General Discussion	86
Minutes of Wednesday's Session (June 25, 1930):	
Report of the Committee on Operating Economics	103
Discussion by:	
Claude L. Van Auken	128
H. E. Jordan	131
L. J. Turley	134
A. T. Mercier	135
Minutes of Thursday's Session (June 26, 1930):	
Report of the Committee on The Passenger	141
Presentation of, by William W. Holden	144
General Discussion	147
Report of the Committee on The Equipment	162
Discussion	183
Installation of Officers	191
Presentation of Past President's Badge	191
Contributors to Discussions	192
Summary Index of Previous Proceedings:	
American Street and Interurban Railway Transportation and	
Traffic Association	194
American Electric Railway Transportation and Traffic Asso-	
ciation	196
General Index	205

OFFICERS, 1929-1930

(Officers of the 1930 Convention)

PRESIDENT:

SAMUEL RIDDLE,

Vice-President, Louisville Railway Company, Inc.,

LOUISVILLE, KY.

FIRST VICE-PRESIDENT:

PAUL E. WILSON,

Vice-President and Secretary, The Cleveland Railway
Company,

CLEVELAND, OHIO

SECOND VICE-PRESIDENT:

GEORGE B. ANDERSON,

Los Angeles Railway,

LOS ANGELES, CAL.

THIRD VICE-PRESIDENT:

R. N. GRAHAM,

Manager of Railways, The Pennsylvania-Ohio Public Service
Corporation,

YOUNGSTOWN, OHIO

SECRETARY-TREASURER:

GUY C. HECKER,

General Secretary, American Electric Railway Association,

NEW YORK, N. Y.

EXECUTIVE COMMITTEE

THE OFFICERS AND

F. L. BUTLER, Vice-President, Georgia Power Company, Atlanta, Ga.

ADRIAN HUGHES, JR., Superintendent of Bus Transportation, The United
Railways & Electric Company of Baltimore, Baltimore, Md.

D. L. FENNELL, General Superintendent of Transportation, Kansas City
Public Service Company, Kansas City, Mo.

C. H. EVENSON, Superintendent of Transportation, Chicago Surface
Lines, Chicago, Ill.

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OFFICERS, 1930-1931

(Officers elected at the 1930 Convention)

PRESIDENT :

PAUL E. WILSON,
Vice-President and Secretary, The Cleveland Railway
Company,
CLEVELAND, OHIO

FIRST VICE-PRESIDENT :

GEORGE B. ANDERSON,
Los Angeles Railway Company,
LOS ANGELES, CAL.

SECOND VICE-PRESIDENT :

R. N. GRAHAM,
Manager of Railways, The Pennsylvania-Ohio Public Service
Corporation,
YOUNGSTOWN, OHIO

THIRD VICE-PRESIDENT :

F. L. BUTLER,
Vice-President, Georgia Power Company,
ATLANTA, GA.

SECRETARY-TREASURER :

GUY C. HECKER,
General Secretary, American Electric Railway Association,
NEW YORK, N. Y.

EXECUTIVE COMMITTEE:

THE OFFICERS AND

- ADRIAN HUGHES, JR., Superintendent of Bus Transportation, The United
Railways & Electric Company of Baltimore, Baltimore, Md.
D. L. FENNELL, General Superintendent of Transportation, Kansas City
Public Service Company, Kansas City, Mo.
C. H. EVENSON, Superintendent of Transportation, Chicago Surface
Lines, Chicago, Ill.
WILLIAM W. HOLDEN, Manager of Traction Department, San Antonio
Public Service Company, San Antonio, Texas.

COMMITTEES, 1929-1930

THE EQUIPMENT

L. C. DATZ, *Chairman*

H. H. ADAMS
R. J. BENNETT
V. W. BERRY
H. H. DARTT
L. J. DE LAMARTER
W. R. McRAE

M. G. MOORE
T. W. NOONAN
E. A. PALMER
E. J. ROCHE
TERANCE SCULLIN
ALEXANDER SHAPIRO

DEL. A. SMITH
C. W. STOCKS
C. H. STRONG
J. C. THIRLWALL
A. T. WARNER
P. J. WOOD

ADRIAN HUGHES, JR., *Sponsor*

THE MOVEMENT OF THE VEHICLE

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O. A. BROTEN
C. H. CHAPMAN
M. W. COOKE
J. F. CRAIG
H. H. DARTT
A. J. FINE

DONALD GOODRICH
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DEAN J. LOCKE
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E. D. MERRILL
JOHN METCALF

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E. A. PALMER
R. H. PINKLEY
J. B. STEWART, JR.
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W. E. THOMPSON

D. L. FENNELL, *Sponsor*
PAUL E. WILSON, *Sponsor*

NOMINATIONS

W. H. BOYCE, *Chairman*

L. H. PALMER

H. B. POTTER

OPERATING ECONOMICS

JOE R. ONG, *Chairman*

WILLIAM B. BENNETT
J. P. W. BROWN
C. F. CRANE
HORACE FLIGG
C. H. FORSGARD
T. G. HAMILTON
J. E. HEBERLE

A. M. HILL
R. B. HILL
THOMAS HOOKER
F. H. MILLER
H. G. MORRIS
E. MURPHY

C. D. PORTER
DEL. A. SMITH
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J. P. TRETTON
EDWARD A. WEST
HOWARD R. WHITNEY

C. H. EVENSON, *Sponsor*
PAUL E. WILSON, *Sponsor*

THE PASSENGER

WILLIAM W. HOLDEN, *Chairman*

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HUDSON BERRY
D. E. BLAIR
W. B. BRADY

C. M. CHENEY
HALBERT O. CREWS
J. B. DONLEY
JOHN F. GALLAGHER
R. N. GRAHAM, *Sponsor*

D. J. GRAHAM
JOHN R. MARSH
E. B. SANDERS
EUSTACE SMITH, JR.

CONVENTION PROGRAM

GEORGE B. ANDERSON, *Chairman*
PAUL E. WILSON, *Vice-Chairman*

F. L. BUTLER
BURT HAMERSTROM

A. T. MERCIER
J. P. POTTER

EDWARD A. WEST

SMALL CITY OPERATION

A. C. SPURR, *Chairman*

M. ACKERMAN
H. BIGELOW
JOHN S. BLEECKER
R. F. CARBUTT
E. M. CARR
JOHN F. GALLAGHER
H. L. GEISSE

L. F. GILLETT
A. H. GOSSARD
J. A. GREENLAND
L. W. HEATH
WM. M. B. LORD
CHARLES A. MEYER
F. A. PERSONS
F. L. BUTLER, *Sponsor*

R. E. PLIMPTON
I. H. PRITCHARD
J. T. REILLY
C. B. SHORT
A. WILLIAM SPERRY
G. W. WELSH
H. E. WEYMAN

THE TRANSPORTATION EMPLOYEE

CLINTON D. SMITH, *Chairman*

JEFF L. ALEXANDER
L. P. BAUREHNN
A. W. BROKMAN
DR. HART E. FISHER
A. L. HODGES

H. R. HORTON
E. K. MILES
J. M. PENICK
R. M. READE
W. J. ROUNTREE
C. H. EVENSON, *Sponsor*

D. A. SCANLON
EDWARD C. SPRING
EUSTACE SMITH, JR.
JOSEPH L. TROY

CONVENTION PROGRAM

SAN FRANCISCO, CALIFORNIA, JUNE 23 to 26, 1930
All Sessions held in the Fairmont Hotel

FIRST SESSION, MONDAY, JUNE 23

SAMUEL RIDDLE, *Chairman*

CONVENTION CALLED TO ORDER

ANNUAL ADDRESS OF PRESIDENT

ANNUAL REPORT OF EXECUTIVE COMMITTEE

ANNUAL REPORT OF SECRETARY-TREASURER

REPORT—COMMITTEE ON NOMINATIONS—W. H. Boyce, Chairman; Commercial Manager, Pittsburgh Railways Company, Pittsburgh, Pa

ELECTION OF OFFICERS

OTHER BUSINESS

REPORT—COMMITTEE ON THE TRANSPORTATION EMPLOYEE—Clinton D. Smith, Chairman; Superintendent, Department of Personnel, The Cleveland Railway Company, Cleveland, Ohio

DISCUSSION

REPORT—COMMITTEE ON THE MOVEMENT OF THE VEHICLE—C. W. Wilson, Chairman; Manager Research Department, Pittsburgh Railways Company, Pittsburgh, Pa.

DISCUSSION

LUNCHEON MEETING, TUESDAY, JUNE 24

TRANSPORTATION PROBLEMS OF THE SMALL CITY
F. L. BUTLER, *Sponsor*

SECOND SESSION, WEDNESDAY, JUNE 25

SAMUEL RIDDLE, *Chairman*

Executive's Day

This session was arranged to be of special interest to executives attending the convention.

REPORT—COMMITTEE ON OPERATING ECONOMICS—Joe R. Ong, Chairman; Director of Research, The Cincinnati Street Railway Company, Cincinnati, Ohio

DISCUSSION

"THE COMPANY, THE PUBLIC AND THE MUNICIPALITIES"—Hon. Edwin O. Edgerton, Former President, California Railroad Commission, San Francisco, Cal.

DISCUSSION

THIRD SESSION, THURSDAY, JUNE 26

SAMUEL RIDDLE, *Chairman*

REPORT—COMMITTEE ON THE PASSENGER—William W. Holden, Chairman; Manager of Traction Department, San Antonio Public Service Company, San Antonio, Tex.

DISCUSSION

REPORT—COMMITTEE ON THE EQUIPMENT—L. C. Datz, Chairman; Chief Engineer, St. Louis Public Service Company, St. Louis, Mo.

DISCUSSION

GENERAL DISCUSSION

INSTALLATION OF OFFICERS

PRESENTATION OF PAST PRESIDENT'S BADGE

ADJOURNMENT

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MINUTES OF THE 1930 CONVENTION

MONDAY AFTERNOON SESSION

JUNE 23, 1930

The first session of the twenty-third annual Convention of the American Electric Railway Transportation and Traffic Association convened at two-fifteen o'clock, June 23, 1930, in the Fairmont Hotel, San Francisco, California, First Vice-President, Paul E. Wilson, presiding.

CHAIRMAN WILSON:—We will read a telegram from President Riddle:

"Please extend my greetings to the members of the Transportation and Traffic Association assembling in convention this afternoon and express my sincere regrets that I am unable to be present. I am sure you will find in your deliberations the same inspiration to go forward that you have always found in the Association's meetings."

The annual report of the President will, therefore, be read by Mr. George B. Anderson, Second Vice-president of the Association.

[Mr. Anderson read the address as follows.]

ADDRESS OF THE PRESIDENT

The American Electric Railway Transportation and Traffic Association meets today in its annual convention. We are twenty-three years old, and our life has not been uneventful. Nor does monotony promise to mark our future. Since that day in 1907 when the Executive Committee of the American Electric Railway Association decided that an affiliated association should be organized, composed of men in charge of transportation and traffic matters, we have come a long way. We were created to take over many of the studies previously conducted by the American Association, leaving the latter body free to discuss and consider the broader questions of general policy, such as federal, state and municipal regulation, franchises, taxation and similar general sub-

jects. I think it may be said with all modesty that since our organization meeting in New York City, January 30, 1908, we have carried forward the torch entrusted to us in a manner that has given the American Association no reason to regret its decision.

The Transportation and Traffic Association, while the youngest of the affiliated bodies of the American Electric Railway Association, has made valuable contributions to the industry through the study, research and deliberations of its many committees. The industry's very life depends on the major problem that confronts us today, the diminishing number of riders. We are scarcely maintaining the number of passengers heretofore carried annually and are not receiving the benefits that might be expected to accrue from constantly increasing population. Our plants generally have been extended to keep pace with the improvements in the arts and sciences, but we do not find a proportionately augmented demand for the service we are capable of rendering. We are challenged today by more private automobiles than ever before. The result of their existence not only was a decrease in the use of mass transportation and an ever-increasing traffic congestion, but our service also was made less attractive to our patrons because we were unable to attain the higher rates of speed possible through the use of modern equipment.

In considering this problem, it was the belief of your officers and Executive Committee that the activities of the Association might profitably be directed during the current year along the same lines as in the previous year. Five of our committees therefore were continued for further study, research and collaboration. Due to the fore-shortening of the Association's year by approximately four months, the available time for committee work was materially curtailed. However, your committees have expended no less energy, effort and thought on the subjects assigned them than in previous years, as will become evident as the convention proceeds.

The subjects chosen for committee study this year are of vital importance to the industry. In order that the greatest possible benefit may be derived from their consideration, it is hoped when discussion of committee reports is called for that there will be a full, spontaneous response. By necessity, committee membership must be limited, with a personnel geographically so distributed that a general cross section of conditions and practices may be immediately available. Naturally committee findings must be based on the actual experience of their individual members or on information obtained from operating companies. This year's committees have worked faithfully to give you the very best data they could obtain, but you are in no sense obligated to agree with their conclusions. In fact, not only is this convention's chief value the opportunity it affords for exchange of thought and practice, but this year there is a special reason why our discussions should be unusually full. Many transportation men normally attending this convention unfortunately are not present. They are vitally interested in

these subjects and they will be particularly anxious to get the viewpoint and experiences of those operating in the extreme Western territory of the Association's area. All discussion will be transcribed and published in the convention Proceedings so that those not present may profit by the activities of the Association.

To conform with the custom of the American and the other Affiliated Associations, your officers and members of the Executive Committee directed the appointment of a Nominating Committee prior to the opening session of the convention. This committee has prepared its report and the election of officers and Executive Committee men will be a matter of business at this afternoon's session instead of at the last meeting of the convention as in the past.

I wish to take this opportunity to express my keenest sense of appreciation to my fellow officers and the members of the Executive Committee for their full-hearted assistance and cooperation in carrying on the work of the Association during the past year. I, too, wish to express the gratitude and indebtedness of your officers and Executive Committee to the chairmen and the members of the several committees who have conscientiously labored in the preparation of the reports which they will submit, and we also are grateful to Secretary Hecker and the Association staff for the helpful assistance and cooperation that they have given our activities.

CHAIRMAN WILSON:—The next order of business is the annual report of the Executive Committee.

[On motion by Mr. Evenson, seconded by Mr. Anderson, the report of the Executive Committee was accepted and adopted without reading. The report in full is as follows:]

ANNUAL REPORT OF EXECUTIVE COMMITTEE

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN:—Your Executive Committee submits its report as follows:

Meeting October 3, 1929

President Riddle called the meeting to order at Atlantic City, N. J.

Organization of committee work for the coming year was the principal business of the meeting. Report of the Subjects Committee on proposed work for the new year was considered, as follows:

SMALL CITY OPERATION: It was decided to continue the Committee on Small City Operation with F. L. Butler as sponsor and A. C. Spurr as chairman and approximately the same personnel as last year. It was suggested that a member of the headquarters' staff be appointed to work in close cooperation with this committee.

THE PASSENGER: It was voted to continue this committee with R. N.

Graham as sponsor and W. W. Holden as chairman. The recommendation of the chairman of the 1929 committee, that the Association employ a man specially trained in making market analyses for the purpose of working with the committee and also visiting a number of properties to confer with the managements in the methods of making market analyses, was discussed at some length by the committee and approved subject to approval by the American Association. On motion of Mr. Fennell, it was decided to leave the selection of such a market expert to the chairman of the committee, W. W. Holden, and, referring back to the action in connection with the committee on Small City Operation, it was also voted to leave the selection of the member of the headquarters staff to work with the committee to the chairman of that committee.

THE TRANSPORTATION EMPLOYEE: It was voted to continue the Committee on The Transportation Employee with C. H. Evenson as sponsor and C. D. Smith as chairman. The subjects suggested for the work of this committee were, an investigation of accident proneness among trainmen and a study of detailed instruction of and the proper contact of the conductor.

THE EQUIPMENT: It was voted to continue the Committee on The Equipment with Adrian Hughes as sponsor and W. R. Rossell as chairman. The suggestion was made that this be made a joint committee with the Engineering Association but, on further discussion, it was felt more desirable to keep it a Transportation and Traffic Committee but to invite a certain number of engineers to serve on the committee. The following were suggested as possible engineering or mechanical members of the committee: J. C. Thirlwall of the General Electric Company; H. H. Adams of the Chicago Surface Lines; T. Scullin of the Cleveland Railway, P. J. Wood of the Erie Railways; and E. A. Palmer of the Westinghouse Electric and Manufacturing Company. It was also decided to invite the car manufacturers to appoint representatives on the committee.

MOVEMENT OF THE VEHICLE: It was voted to continue this committee with Daniel Fennell and Paul Wilson as sponsors, and Clyde W. Wilson as chairman. There was some question as to whether the name, Movement of the Vehicle, was the most appropriate designation for this committee but, no better suggestion being offered, it was continued for the time being. Mr. Holden suggested as a subject for this committee's work the study of auto registrations in cities and their effect upon the riding habit. The name of John P. O'Connell was suggested for membership on the committee.

OPERATING ECONOMICS: Mr. Wilson called attention to the fact that there was no organization for the study of the economics of operation from the practical standpoint, as opposed to the executive or policy standpoint, which is the standpoint from which such subjects are approached by the American Association. He suggested, therefore, the appointment of a Transportation and Traffic Committee to fill this need and to study the economics of street railway operation from the sole

standpoint of the practical operator or manager. The suggestion was received with approval and it was decided to organize such a committee with Messrs Wilson and Evenson as sponsors and Mr Joe R Ong as chairman. Mr. Wilson as sponsor will amplify later his ideas as to the proper function of this committee and the lines along which it should work.

In connection with all of these committees, it is understood that the members will be selected by the chairmen in cooperation with the sponsors and the president.

This completed the organization of the committees for the new year. It was decided that the next meeting of the committee would be called some time about the 10th of December at Chicago, Illinois.

There being no further business to come before the meeting it was adjourned.

Respectfully submitted,

E J. MURPHY,
Secretary, pro tem

Meeting December 10, 1929

President Riddle called the meeting to order at Chicago, Ill.

The meeting convened at 10:20 A. M. and adjourned at 4:10 P. M. Officials of the Chicago Surface Lines were hosts to the Committee at luncheon at the Union League Club, during which time there occurred an interesting informal discussion of business conditions and the effect of the recent stock market decline on the electric railway situation in the communities represented by the committee members.

MINUTES OF PREVIOUS MEETING: The minutes of the meeting held in Atlantic City, October 3, were approved without reading, as circulated by the Secretary on October 11. The secretary reported as follows the action of the American Executive Committee on three recommendations made at the October 3 meeting of the Transportation and Traffic Executive Committee:

- 1 The recommendation that a headquarters' staff man be designated to work in close cooperation with the Small City committee, was referred to the Managing Director with power to take suitable action.
2. The recommendation that a market analysis expert be employed to make surveys in a number of cities under the direction of The Passenger committee, was referred to the Finance and Policy committees.
3. The recommendation that the American Executive Committee approve the Schaeffer prone pressure method of resuscitation was favorably acted on.

COMMITTEE ORGANIZATION: President Riddle announced the completion of the personnel of all committees. He stated that one committee had already met and that all others were contemplating meetings at early dates. The secretary suggested that the practice of appointing each year an Editing Committee be discontinued, as the editing of the Proceedings can be handled by Association headquarters. This suggestion was approved.

COST ANALYSIS METHODS: The secretary was instructed to bring to the attention of the Accountants' Executive Committee, the cost analysis methods set forth in the 1928 report of the committee on Bus Operation and the 1929 report of the committee on The Equipment, and suggest the desirability of collaboration between the Accountants' and the Transportation and Traffic Associations in completing the study of such method.

NOMINATION AND ELECTION OF OFFICERS. On motion by Paul E. Wilson, seconded by F. L. Butler, it was voted to change the procedure in the election of officers by moving the election forward to the first or second convention session, instead of the last session as at present. It was also agreed that the report of the Nominating committee should be presented in time to permit its publication in the issue of *Aera* prior to the convention. It was pointed out also that the terms of office of the present officers and executive committee members will expire in June, 1930, due to the holding of the convention in that month.

CONVENTION PROGRAM: The secretary read a letter dated December 2 from chairman George B. Anderson of the Program Committee outlining a tentative program for consideration. There was an extended discussion of the proposed program. Luncheon conferences and their effect upon the sessions of the Transportation and Traffic Association meetings was the subject of lively discussion, terminating in the following motion being approved by D. L. Fennell, and seconded by F. L. Butler:

Voted that it is the consensus of opinion of those present at this meeting that luncheon conferences during the past three years have interfered seriously with the attendance at, and interest in, the meetings of the Transportation and Traffic Association; and that this motion be brought to the attention of the Program Committee of the American Association, with the suggestion that in the future fewer luncheon conferences be held and also that no subjects under study by Transportation and Traffic Association committees be chosen as topics for luncheon conferences.

COMMITTEE ACTIVITIES: Chairman J. R. Ong of the committee on Operating Economics said that he expected to meet with the sponsors after this meeting to outline the scope of the work and that he expected to call his committee together in January. President Riddle announced the appointment of A. C. Spurr as a member of this committee for the purpose of coordinating its work with that of the Small City committee.

Chairman C. W. Wilson of the committee on the Movement of the Vehicle said he did not have a clear understanding of the scope of the work assigned to the committee. After some discussion Mr. Wilson was instructed to elaborate upon the work done by the previous committee and to give particular attention to studies for the purpose of making recommendations on

1. Suitable parking regulations under various conditions, such as traffic volume, width of street, etc.

2. Traffic control and parking in relation to accident prevention.

The committee also was requested to study automobile registration in cities and its effect on public transportation.

Chairman Holden of The Passenger committee stated that the work of the committee this year would depend largely upon whether the employment of a specialist is authorized for making market analyses in a selected group of cities. He said the only alternative probably would be to have the members of the committee conduct such surveys in their own cities. He emphasized the importance of a uniform plan of survey so that results may be comparable and expressed the opinion that far better results would be obtained by a specialist in business survey work.

Chairman A. C. Spurr announced that the Small City committee had met in New York on December 6, with 17 members present. He said a subcommittee on procedure had been appointed and that this year especial attention would be given to the subject of return on new capital invested and to results obtained with various fare systems in use. Committee members will furnish complete data for their own properties and in addition each will visit several other properties and obtain similar data. A four-day meeting will then be held to analyze and discuss the data gathered and to outline the nature of the report to be made.

Chairman C. D. Smith said he was planning a meeting of the committee on The Transportation Employee in Cleveland on January 23, and that prior to the meeting the work would be started through correspondence. Special study will be given the subject of training from the standpoint of accident prevention, including group conference training methods, job analysis, etc. He plans to have the second and final meeting in the latter part of April.

Chairman L. C. Datz said the committee on The Equipment would meet in New York on January 6 and that prior to the meeting he would get in touch with the sponsor to outline a definite plan of conducting the work this year.

BUSINESS SURVEYS: In a general discussion of the desirability of business surveys, Mr. Spurr called attention to surveys made by students as a part of their public utility courses at Harvard and other universities. He suggested that arrangements might be made through those in charge of such courses to have students make surveys of some of the small city properties. After discussion it was suggested that Mr. Spurr take up the matter with several universities having public utility courses.

CORRESPONDENCE: Mr. Fennell suggested that committee chairmen and sponsors send copies of their correspondence to executive committee members.

Respectfully submitted,

G. C. HECKER,
Secretary-Treasurer.

Meeting March 3, 1930

President Riddle called the meeting to order in San Antonio, Texas.

1. A letter dated February 19 from Chairman Ong of the committee on Operating Economics was read and discussed. In this letter, Mr. Ong had outlined the ground covered by the committee at its first meeting, and had asked the Executive Committee to advise if the program of work as outlined was satisfactory. Following the discussion, Paul E. Wilson agreed to write Mr. Ong giving him the views of the Executive Committee.

2. President Riddle reported the appointment and acceptance of W. H. Boyce, chairman, and H. B. Potter and L. H. Palmer as the committee on Nominations for the current year.

3. The President reported that at the January 24 meeting of the American Association Executive Committee, the request of the committee on The Passenger for the employment of a market analysis expert had been disapproved.

4. The President reported that the Accountants' Association had designated the subcommittee on Bus Accounting of the committee on the Standard Classification of Accounts, to cooperate with the Transportation and Traffic Association committee on The Equipment in a joint study of cost analysis methods.

5. Chairman W. W. Holden of the committee on The Passenger reported that the work of the committee was well under way, but that it would be impossible to have a final report completed in time for the convention. He said that this year's report will therefore have to be a progress report.

6. Chairman George B. Anderson of the Program committee presented a complete tentative program.

7. It was voted to instruct General Secretary Hecker to notify all committee chairmen of the final day on which reports must be in his hands for consideration and approval by the Executive Committee, with the understanding that the final meeting of the Executive Committee would be held at Association headquarters, Friday, May 2.

Respectfully submitted,

C. H. EVENSON,

Acting Secretary.

Meeting May 2, 1930

President Riddle called the meeting to order at 10:00 A. M. at Association Headquarters, New York, N. Y.

Final reports of the committees on "The Equipment," "The Movement of the Vehicle," "Operating Economics," "The Passenger" and "The Transportation Employee," were presented and approved with certain modifications. The secretary was instructed to have those reports printed for distribution in advance of the annual convention.

The report of the committee on Small City Operation was presented and several minor modifications made. On motion by Paul E. Wilson,

seconded by C. H. Evenson, it was voted to request President Riddle to advise the President of the American Association of the receipt and approval by the Transportation and Traffic Executive Committee, of the report of the committee on Small City Operation; and at the same time to transmit a copy of the report with the chairman's letter of transmittal to the President of the American Association for a decision as to whether or not the report will be printed and included in the Proceedings of either the American or the Transportation and Traffic Association.

The above action was taken in view of the fact that the report will not be presented at a regular meeting of either Association, but at a luncheon conference of the American Association.

The convention program was reviewed briefly, and a letter from George B. Anderson, chairman of the Program committee, was read suggesting the names of a number of discussioners for the several committee reports. The Executive Committee approved all of Mr. Anderson's suggestions, and requested the Secretary to send out the necessary letters of invitation and copies of reports. In addition, the Secretary was instructed to add to the list the names of any members whom he knew would be in attendance at the convention, and whom he thought would be sufficiently interested to take part in the discussion.

The report of the committee on Nominations was presented, and the Secretary authorized to publish it in the May issue of *Aera*.

Following a brief discussion regarding the desirability of appointing a committee on Subjects at this time, it was voted to defer action until after the convention. It was also voted that this would be the final meeting of the Executive Committee for the current year, and that the next meeting, which will be subject to call by the incoming President, the appointment of a Subjects committee and the determination of suitable subjects for committee work in 1931, be taken up.

Respectfully submitted,

GUY C. HECKER,

Secretary-Treasurer.

CHAIRMAN WILSON:—Next is the annual report of the Secretary-Treasurer which will be read by Acting Secretary Vickers.

[Mr. Vickers then read the annual report of the Secretary-Treasurer as follows:]

REPORT OF THE SECRETARY-TREASURER

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN:—Although this has been a short year, your Secretary-Treasurer is glad to report unusual activity on the part of your various committees. All reports were completed on schedule time and are available to you here in printed form with the exception of the report

of the committee on Small City Operation which will serve as the basis of discussion at a luncheon conference held under the auspices of the American Association.

Following up its 1929 work, the committee on The Passenger made arrangements for market analysis surveys by Dr. W. J. Reilly in six cities. These surveys were made at the expense of the companies in those cities, and have only recently been completed. The results, therefore, are not available at this time but doubtless the information developed will furnish the committee much valuable material for its report next year. The fostering of such an activity by a committee is rather unique, and it is hoped that it will be productive of beneficial results not only to the properties on which the surveys were made, but to the entire industry.

An innovation in committee work was tried out this year by the committee on Small City Operation. Operating and financial statistics were collected for the committee by Mr. Leslie Vickers, Economist at Association headquarters, and comparative data arranged for presentation and discussion at a meeting of the committee which covered a three-day period. At this meeting, each member of the committee was called upon for a statement of the situation on his property covering operating methods, merchandising and publicity, general financial condition and other facts. A general discussion followed each statement and members of the committee were cross-examined at considerable length in order to bring out as clearly as possible the problems confronting the small city property. At the close of the meeting, each member was asked to forward to the chairman any conclusions regarding the small city situation which he may have obtained as a result of the three-day discussion. Upon those conclusions the committee based its report, briefly summarizing the problems of the small city company and presenting suggestions on various phases of small city operation. It was the unanimous conclusion of the committee that the procedure followed at the three-day meeting had been extremely beneficial.

The general activities of the headquarters' organization are covered in my report as General Secretary of the American Association, and I shall not repeat them here. The services of the staff at headquarters are available to you at all times, and I trust that you will make increasing use of the headquarters' facilities. I shall be glad at any time to receive criticisms of the service and suggestions for improvement.

In closing, I wish to report that on June 1, 1930, your Association had 172 individual members, a decrease of seven since the beginning of the current year.

Respectfully submitted,

G. C. HECKER,

Secretary-Treasurer.

E. J. McILRAITH:—I move the report be accepted.
[The motion was seconded and carried.]

CHAIRMAN WILSON:—The President's address pointed to the change in the procedure of this Association with respect to the nomination and election of officers. It was felt by the American Association that this should conform to their practice. Consequently, a Nominating Committee was appointed and reported in time for their suggestions to be printed in the issue of *Aera* preceding this convention.

I will ask the Secretary to read the report of the committee on Nominations at this time.

[Acting Secretary Vickers then read the report as follows:]

REPORT OF THE COMMITTEE ON NOMINATIONS

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN:—Your Committee submits the following nominations for the coming year:

For President: Paul E. Wilson, Vice-President and Secretary, The Cleveland Railway Company, Cleveland, Ohio

For First Vice-President: George B. Anderson, Director of Personnel, Los Angeles Railway, Los Angeles, Cal.

For Second Vice-President: R. N. Graham, Manager of Railways, Pennsylvania-Ohio Public Service Corporation, Youngstown, Ohio

For Third Vice-President: F. L. Butler, Vice-President, Georgia Power Company, Atlanta, Ga.

For Secretary-Treasurer: Guy C. Hecker, General Secretary, American Electric Railway Association, New York, N. Y.

For Executive Committee: The Officers and Adrian Hughes, Jr., Superintendent of Bus Transportation, The United Railways & Electric Company, Baltimore, Md.; D. L. Fennell, General Superintendent of Transportation, Kansas City Public Service Company, Kansas City, Mo.; C. H. Evenson, Superintendent of Transportation, Chicago Surface Lines, Chicago, Ill.; William W. Holden, Manager Traction Department, San Antonio Public Service Company, San Antonio, Texas

L. H. PALMER,

H. B. POTTER,

W. H. BOYCE, *Chairman,*

Committee on Nominations.

CHAIRMAN WILSON:—Gentlemen, a motion to approve this report is in order.

J. L. ALEXANDER:—I move that the report be adopted and the Secretary be instructed to cast a unanimous ballot for the nominees.

[The motion was seconded.]

CHAIRMAN WILSON:—It has been duly moved and seconded that the report of the Committee on Nominations be accepted. Are there any remarks? [There was no response.] Will all in favor of the adoption signify by saying "aye"; . . . contrary minded, "no."

I declare the nominees duly elected.

CHAIRMAN WILSON:—The report of the committee on the Transportation Employee, Clinton D. Smith, chairman, is next on the program. The report will be presented by Jeff L. Alexander.

[Mr. Alexander then read the report as follows:]

REPORT OF THE COMMITTEE ON THE TRANSPORTATION EMPLOYEE

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN: Analysis of the transportation job, with the correlated subsequent supervisory and employee training and a study of proneness to accidents, are the items to which special attention is given in the report of the Committee on The Transportation Employee.

The study of accident proneness covers several factors affecting efficient operation, although it is recognized that accidents comprise the more definite unit for measuring the faults. In seeking the fundamental cause for this proneness, we find a need for improved selection of trainmen and coach drivers, proper choice of the supervisory employee, and better training of both.

The industry is sold to the general need of training and a study of the accident situation. It appreciates good supervision when such is given. This report, therefore, is devoted to an emphasis of previously accepted technique of selection procedure; to a more thorough job analysis of the positions of motorman, conductor, one-man operator, coach driver and the correlated supervisory positions.

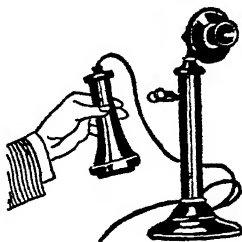
The term supervisor, as here used, includes broadly that group of employees in whom is vested the control of the operation of transportation vehicles. The supervisor may be known as superintendent of transportation, division or district superintendent or supervisor, supervisor, inspector, station master, dispatcher, starter, station clerk or any of

the many other terms applied. The word "trainman" includes motorman, conductor, one-man car operator and coach or bus driver.

Job analysis necessitates a study on the job. Training must be programmed only after a determination of the relative weights to be given the several items listed in the job analysis and specification. Job analysis and training requires for direction a supervisory force of good intelligence and thorough training.

Organized follow up in the development of all these activities is imperative. It is the key to efficient transportation personnel.

ACCIDENT PRONENESS



- (1) What is it?
 - (a) An analysis of accidents of 3290 trainmen from 32 railway companies reveals that 39 per cent of the employees have 68 per cent of all the collision accidents. The accompanying chart (Fig. 1) is illustrative of the small number of men who have the majority of accidents (a high frequency of accidents).
- (2) Why is a study of high accident frequency or accident proneness essential?
 - (a) A few employees are creating the major accident expense.
 - (b) The accident-prone employee is generally inefficient.
 - (c) Study of the accident-prone employee eliminates non-productive expense of general mass appeal.
- (3) How is the work carried on?
 - (a) The man is classified according to the number of his accidents.
 - (b) A study of his record is made to classify the type of accidents in which he is involved.
 - (c) Observations are made to determine what fundamental characteristic has been responsible for the major number of his accidents.
 - (d) The employee is interviewed by a specially selected (and trained for this) supervisor. He discusses the situation, analyzing the various cases and observations made. Cooperation of the employee is essential and, therefore, the personal interview is conducted accordingly.

(4) What have been the results?

- (a) There have been discovered definitely some employees whose mental or physical faculties have been impaired due to advanced years, or because of accident and disease. Such employees may be taken care of under the disability clause of group life insurance or pension plans, where available, or they may be transferred to other activities. The number of these cases can be materially reduced by periodic medical examination.
- (b) Some are found who are not equal to the requirements of service because of low intelligence. These employees get into a rut when their jobs require almost the same operation month after month; emphasizing the need of careful selection and frequent supervision.
- (c) A third group is found in need of training, is re-instructed and followed up. This has resulted in a decrease in the frequency rate of accidents for those men. Follow-up instructors continue special attention to these men and rate them according to a standard unit of observation.

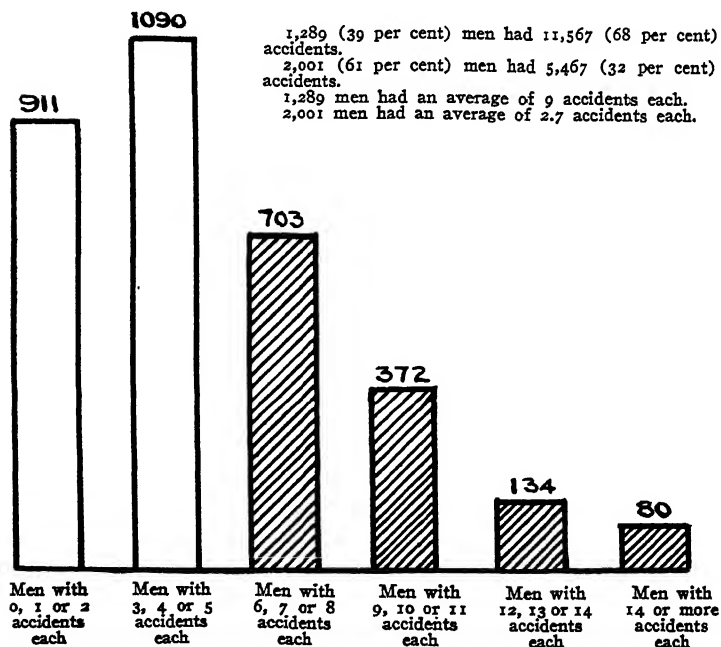


FIG. 1—DISTRIBUTION OF COLLISION ACCIDENTS AMONG 3290 TYPICAL OPERATORS OF 32 STREET RAILWAY COMPANIES

- (d) Many men will, of themselves, eliminate some of the accident producing conditions through group conferences which should accompany accident prone activity.
- (5) Accident-prone studies show conclusions:
 - (a) There is definite need for intensive supervisory training and job analysis.
 - (b) Training should follow job analysis.
 - (c) Selection and training of employees should be given greater study

SELECTION OF TRANSPORTATION EMPLOYEES

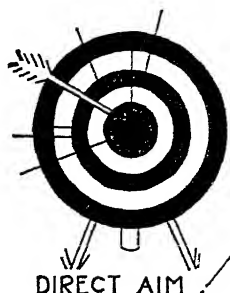


- (1) Preliminary interview of applicants requires skill.
 - (a) Interviewer must not injure public relations in rejecting undesirables.
 - (b) A code indicating outstanding characteristics of applicant facilitates records.
- (2) Physical standard must be high.
 - (a) The examination must be rigid and conducted after an analysis of the job to conform to the determined standards. Misguided sympathetic consideration of physical defective or casual physical examinations must be avoided.
 - (b) Public service demands good physical appearance.
 - (c) Accident records on previous jobs should be secured. Prone-ness to accidents on any job should disqualify applicant.
- (3) Applicants should be tested for proneness to inefficiencies.
 - (a) Tests are often effective to demonstrate applicant's ability to observe and to respond under situations simulating actual employment.

SUPERVISORY TRAINING

1. High grade men on the supervisory staff are desirable for
 - a. So far as the trainmen are concerned, the supervisory staff is the company since
 - (1) Company ideals and policies are not likely to take on any more significance than is given them by the supervisory force, inasmuch as
 - (a) The supervisors are the only officials with whom the trainmen have frequent daily contact.
 - b. The supervisory force exerts an influence on costs and methods through
 - (1) The assignment of trainmen, operation of extras, etc.
 - (2) The handling of trainmen.
 - (3) The handling of the public (a direct responsibility of the inspector or street supervisor and, to a lesser degree of the station master or dispatcher).
2. The supervisory staff must itself be properly trained for
 - a. Proper supervision demands both practical experience and an ability to think in general terms.
 - (1) Lack of practical experience results in unwise decisions, which cause loss of employee respect, and
 - (2) Lack of ability to think in general terms results in expedients and short-sighted, makeshift policies.
 - (3) Absence of shortcomings of the supervisory staff creates prestige of the company with the public.

JOB ANALYSIS A REQUISITE FOR SERVICE IMPROVEMENT



(1) Analysis of the motorman's job.

Is he making friends or enemies for the company? Does he know how to make his time without having accidents, without wasting power, or without creating unpleasant public relations? Does he know the best way to apply his brakes? Does he know how to handle his car in an emergency? What is the proper relation between speed and efficient operation? Does he need training on any particular of his work?

(2) Analysis of the conductor's job.

Is he, too, making friends or enemies for the company? Does he know how to handle difficult situations? Does he have habits or a personal appearance that need attention? Does he appreciate that more sales per day are made in transportation than in any other business? What are the items affecting his job, over which the conductor has no control, but which bear analysis?

(3) Analysis of the station master's or dispatcher's job.

The station master has a guiding influence over his men. Is he using it properly? Does he have too much clerical work to supervise his men as he should, or does he have too little work to keep alert? Is the work distributed fairly among the station masters? Could he be of more assistance to the accident department if he knew more about an accident report? Does the station master send his men to work in a happy state of mind, or does he rush them out with insufficient time to make adequate preparation? Is he trained in the economics of transportation service?

(4) Analysis of the inspector's job.

Does he realize that his job extends beyond the limited field of keeping cars on time? Can he handle his men and the public properly? Can he correct a man without irritating him? Has he created prestige for himself with the public by demonstrating on the car that he is interested in the passenger's comfort.

(5) Analysis of schedules.

What is the proper running time? Would improved service result if running time were checked by schedule setters? Why is it that some men can make their time and others experience difficulty? Could the slow men be trained to make better time?

These are some of the problems calling for attention when a service improvement program is carefully studied. Some of the problems are research of individuals, others are research of materials; so closely are the two connected that there can often be no clear line of demarcation, but the more that can be found about the conditions as they actually exist, the better the opportunity for a real program of service improvement.

Your Committee does not recommend any standard procedure. Such is a matter for each company to determine for itself. But it stresses that the spirit of study, analysis or research be adopted, and pleads for a serious consideration of the fundamentals listed herein.

Recommendation is made that the Committee on the Transportation Employee be continued, and that special attention be given to supervisory training and job analysis in the further study of the Committee.

Respectfully submitted,

J. L. ALEXANDER,
L. P. BAURHENN,
A. W. BROHMAN,
HART E. FISHER,
A. L. HODGES,
H. R. HORTON,
E. K. MILES,
J. M. PENICK,
R. M. READE,
W. J. ROUNTREE,
D. A. SCANLON,
E. C. SPRING,
EUSTACE SMITH, JR.,
JOSEPH L. TROY,
CLINTON D. SMITH, *Chairman*,
C. H. EVENSON, *Sponsor*,

Committee on the Transportation Employee.

CHAIRMAN WILSON:—I hope that you men who are interested in the training of the employee, or who have notions of your own as to how he may best serve your customers, will not hesitate to give us your ideas.

Mr. Henry H. Norris, Educational Advisor, Boston Elevated Railway Company, is particularly interested in this sub-

ject and has prepared and submitted a discussion, which I will read.

[Chairman Wilson then read Mr. Norris' prepared discussion as follows:]

DISCUSSION OF THE REPORT OF THE COMMITTEE ON THE TRANSPORTATION EMPLOYEE

BY HENRY H. NORRIS

*Educational Advisor, BOSTON ELEVATED RAILWAY, BOSTON,
MASSACHUSETTS*

Nine years ago I was invited to comment upon the Report of the committee of this Association on Personnel and Training of Transportation Department Employees. The comment took the form of a brief paper entitled, "Picking Men for Jobs in the Transportation Department." It may be of interest in connection with our study of this year's report of the committee on The Transportation Employee to repeat certain "principles" which were deduced in connection with that paper. They are as follows:

Principle 1. The selection of employees is so important a function that it should be entrusted only to the most competent man available.

Principle 2. Selection of employees on the basis of quality is infinitely more important than the purchase of materials to specification.

Principle 3. The qualities which in other lines of business enable a salesman to sell are needed in the platform man, particularly the conductor.

Principle 4. Snap judgment is not safe now, and never was safe, in the selection of employees.

Principle 5. If personal and mental qualities are to be considered at all in selecting employees, some kind of objective analysis should be made.

Principle 6. While freak "psychology" should be avoided in selecting employees, modern science should not be ignored.

These so-called principles were set down at the beginning of the post-war activity in the study of transportation personnel problems. Since then much progress has been made in the selection, training and supervision of the transportation employee. Probably the most striking advance has been in the application of modern psychology to accident reduction. This feature is properly stressed in the 1930 report of the committee on The Transportation Employee as was done in the 1929 report of the corresponding committee. Only through the study of the mental and physical causes of accidents can the most satisfactory progress be made.

The experience of the Boston Elevated Railway bears out the dictum of the committee in regard to accident proneness. This experience is recorded in a 200-page reprint of the presentation of the Railway to the Anthony N. Brady Memorial Award Committee, which awarded a

gold medal to the Railway for its safety and sanitation record. A limited number of copies of this reprint are available and will be mailed by the Railway on request.

The committee lists a number of excellent suggestions regarding supervisory training and the value of job analysis. I heartily endorse these suggestions and in doing so direct attention to the usefulness of the conference method for training and for getting over to supervisors, and the rank and file as well, the fundamentals of good supervision and good job performance. The ability to improve customer contacts is desired in both supervisors and car operators. The conference plan, as advocated in its 1930 report by the American Association committee on Employee Relations, is effective for developing such ability.

The reports of the Transportation and Traffic Association committee and the American Association committee supplement each other admirably.

While we are endorsing the recommendations of recent committees of this Association we should not forget the pioneer work done by several committees prior to the World War. This is summarized in an article appearing in the August, 1929, issue of *Acra*, page 474. More than 22 years ago, when this Association was formed, one of the first steps taken was to appoint a committee on Employee Training. This committee collected extensive data, and urged a number of advanced practices including educational training for the men through meetings planned to give transportation employees a broad knowledge of their business. Year after year this work was continued and extended until the World War caused a short suspension.

These committees by their work of compilation, recommendation and dissemination were largely instrumental in developing the high standard of practice in training for actual car operation which exists today. It remained for the later committees to build upon this foundation, devoting attention to such topics as are covered in the 1930 report.

By way of summary, I have had two primary points in mind in making this brief comment on the Committee's report:

First, I have tried to show where it fits into the general and more or less continuous program of employee development which the Association has maintained during the past 22 years.

Second, I have reiterated the value of the conference plan for the supplementary training which transportation employees need, after their job training in the instruction school, in order to enable them to operate with maximum safety and to meet the public in an acceptable manner.

CHAIRMAN WILSON:—Mr. A. T. Mercier will discuss the report next.

A. T. MERCIER:—I have been somewhat interested in the remarks which preceded the report and also in reading the

report itself. Being rather a junior member of this organization, and of the electric railway industry, I want to bring to you people one word, and possibly one thought, that might assist the committee in going on with the report which has been so ably treated and which you have gone into in such extensive detail.

[Mr. Mercier then read his prepared discussion as follows:]

DISCUSSION OF THE REPORT OF THE COMMITTEE ON THE TRANSPORTATION EMPLOYEE

BY A. T. MERCIER

*Vice-President and General Manager, PACIFIC ELECTRIC RAILWAY,
LOS ANGELES, CAL.*

In the study of accident-prone employees, the methods of determining the qualifications of the transportation employee as treated in the report of the committee, are the ones generally adopted, recognized and considered best.

The question that I would like to raise for consideration is, "Are we not paying dearly for the formula we are trying to develop to be used in selecting better transportation employees?"

Our method today occurs to me as being more in the nature of a post mortem. Therefore, I would suggest for consideration by the committee and by transportation men in general, that we give serious thought and more extensive study to the practice that is well established on many of the steam railroads, and on the property with which I am connected, of trying to gauge our men and their qualifications by making analysis of the results of efficiency tests, sometimes called "surprise tests."

Efficiency tests as conducted by a well organized transportation company develop constructive information. They are made with that thought in mind, that they will be used in developing the weaknesses or lack of training in certain departments of our operation, and when the results of these efficiency tests, say some 20 or 30 in number, are charted, we can then set up the men into groups or classifications, such as "Faulty attitude," "Failure to recognize potential hazards," "Faulty judgment of speed or distance," "Impulsiveness," etc., and by making comparison with the primary causes of accidents of the past, we can classify our men into two groups; viz, those who are functioning properly, and those who are not, and then concentrate on an improvement campaign on those who need additional attention or supervision, whether it be medical, operating, educational, or what not.

In talking to the lawyers today who are handling the claims resulting from accidents, they will stress the importance of trying to bring into our service men with mental activity, alertness, quickness to grasp

a situation, and who will react promptly. Some have suggested that we select this class of men for our service by use of an intelligence quiz such as that now used in our army, and used extensively during the World War to develop mental qualifications and ability to think and act quickly.

The medical men will tell us that we should set up a psychological department; that the psychologist can and should play a very important part in the study and selecting of men, and again in the check-up of men in our service, to see that we have not been mistaken in our first conclusions. We crowd into our organization, under stress at times, men who later prove to be mental and moral misfits; not with any marked vicious tendencies, but men and women that are morally or mentally ill, and need the same help and encouragement as those who are physically afflicted.

In other words, they need some form of mental adjustment.

This work has been practiced successfully by some institutions, and it is a matter I pass to you gentlemen for consideration.

Noted psychologists have gone on record to the effect that the average man or woman uses or exercises only about 50 per cent to 60 per cent of their mental capacity. Certain processes have been adopted that are able to put these idle brain cells into action, so that the brain efficiency is increased to as high as 90 to 95 per cent.

The question then arises with us as to what methods should be applied and what incentive to use to set these idle cells in action, so as to build into our organization men who are more efficient.

My answer to this is: leadership, impartial and strict discipline, a full recognition of meritorious work, and learning of inferior work to permit corrective remedies.

In selecting men for promotion, great care must be exercised. First, in selecting men for our service, we should exercise care, and then we should keep in mind those who have capacity and ambition for promotion, because the time will come when opportunity presents itself and if our men are not qualified to accept it, and we should make the error of trying to promote a man who is not qualified, it would be like trying to fit a square plug in a round hole. The results would be disastrous.

So the thought that I would like to leave with this committee and those who will continue the study as to the ways and means of getting desirable men into our organizations, is to carry on a definite campaign, make efficiency tests and analyze them, develop the weakness of the individual, and then provide an incentive that will spur him on to greater efforts, and the better results will follow.

In other words, the industry might well consider adopting and adapting for its use, the most modern and scientific methods of selection and development of its men, and I would like to see the committee develop a definite, practical plan.

A. T. MERCIER:—The time allowed here will not permit an extended discussion of this subject. I hope, however, that the committee will give this one point that I have attempted to bring out some thought and further study.

CHAIRMAN WILSON:—Thank you very much.
Is Mr. Hill in the room?

R. B. HILL:—If the chair will permit, I am not going to attempt to follow this report of the committee, but rather make a few remarks on some of the points brought out by some of the preceding speakers.

I think that Mr. Mercier's point is one that should be considered, that is, finding ways and means of bringing into the service more competent men. If this committee is successful in doing that I am quite sure they will have accomplished something.

This is the 49th anniversary of the meetings of the American Electric Railway Association. No doubt at their first meeting this same subject was discussed. At that time the one thing to be considered was "Can a man cuff a horse good?" I presume that qualification, if he had it, immediately admitted him into service.

It is a long time since that first convention, but I wonder if all companies have kept pace in their desire to bring into the service better employees, at the same pace they have endeavored—and I say "endeavored" advisedly, because I think they have been lacking in this respect—to keep abreast of developments in their engineering department, their electrical department, and their equipment. I do not think that the average property has, by any means, attempted at any time to put forth the same effort, nor expended the same amount of money to attract into the service the proper kind of an employee that they have spent time and money to keep pace with the improvements along other lines. Until such time as any company, or any property, does put forth that effort I think that we will have some difficulty attracting to our service what we might term as a first class man. While it is true they are all striving to earn all they can, nevertheless hours of work mean a lot to all of them and I think you will

all agree with me that I am right in saying that proper working conditions will probably do more to attract to our service the proper kind of employee than any other one thing in the world.

I do not believe that any man in charge of the transportation department on any property is going to get any place with his employees whenever he holds himself aloof from those men. I believe you can get further with your men if you mix with them and show that you are one of them.

We haven't the time to discuss this subject fully, but I just want to leave that one thought, in support of Mr. Mercier's suggestion, in your mind and that is: this committee on the Transportation Employee should find ways and means of attracting into the service the proper kind of employee.

CHAIRMAN WILSON:—I think Mr. Hill has hit what this Association tries to make the key note of these meetings, that is, a full and frank discussion of all reports. As the President stated in his address, it isn't a question of simply endorsing the views of the committee selected primarily for the purpose of getting a cross section of the operating experience of the industry.

Is there any further discussion of this report?

LESLIE VICKERS:—Like Mr. Mercier, I am one of the junior members of this industry, but before coming into it it was my business to have something to do with a great number of other industries from a critical point of view, sitting in an isolated place where I had the opportunity of having information brought to me, while not having the trouble and worry that comes with intimate contact with any industry in particular. But on the basis of what I learned there, I assure you that I welcome this evidence, and the increasing evidences, that we have at last an interest in the transportation employee in this industry. There is no doubt at all that he has been neglected far too long and that we, as an industry, have failed to realize the tremendous place that he can or should play in our business activities.

For some time past we have been criticized for what we have been doing in the way of giving service. We have been

criticized for not being up-to-date, and people are still under the impression that we belong to an industry that is dying. They have criticized us very much because they have had the evidence of other utilities which have been serving them, in their opinion, in a better way. And part of that better service has come from the fact that they have been served by the gas and electric utilities, by highly specialized pieces of machinery, developed at great cost in laboratories and other places, with any amount of money expended upon them, and that is the means, that is the thing, that is the salesman which the users of those other utilities come in contact with.

When you pick up your telephone you take in your hand a small piece of machinery upon which many millions of dollars have been expended, and you can now talk with persons in London, Paris, Berlin, or to ships at sea. When you turn on your electric light, you turn on a bulb that has been developed at the greatest possible expense and is now giving us a very great deal of efficiency. The same is true of the gas that is turned on in our ovens to cook our food. But we sell a service through a street car, or through a bus, and the contact is not so much with that physical apparatus in which we ride as with the person who sells us the ride, meets us at the door, or who handles the controller on the front end of the car. So it seems strange, to one coming from another industry, that more has not been done in this connection to spend money to make sure that the people whom we put on the cars are the best that we can get and that after we get them there we give them that kind of training which will keep them efficient employees, able to deliver properly the service we have to give to the public.

I think there are three things that the transportation employee needs to know:

1. He needs to know the job first of all.

That is very much a mechanical process—how to unhitch the horses in previous days, and how to apply the control or brake properly today.

2. He needs to know his product. He needs to have impressed upon him constantly the nature of the thing he has to sell, which is a safe, convenient, easy ride from one point

to another, as far as he can control it at the time, at a speed which the passengers want to go from that place to the other place.

3. Best of all I think we need to pick men today who know people and who are willing to make, in their humble way, a study of people who board their cars. And while it is not as necessary for the man at the front end of the car to make a study of the people who board the car, it is absolutely necessary for the man at the rear to do so, and most of our activities should be expended in that direction.

It is sometimes difficult for a man to know exactly how to handle all of the situations that come up. Schools are now in operation, and should be more widely extended, to place before the men sample situations, so that these, from time to time, will bring to their minds the circumstances that they might meet, the answers they are to give, and the things that they are to do. That requires a good deal of tact; it requires knowledge and it requires an interest in your job.

I believe the thing we have to impress upon all of our men is that they are constantly selling a service to human beings and they have got to know their service and know the human beings to whom they sell it.

CHAIRMAN WILSON:—Is there any one present who wishes to discuss this report? [There was no response.]

Then we will take up the next order of business, which is the report of the committee on the Movement of the Vehicle.

This is unquestionably one of the best reports, I think, that any committee has submitted at any meeting I have attended. It is nearly 40 pages in length and you needn't fear that I will ask some one to read it. We are, however, very fortunate in having with us Mr. E. J. McIlraith, of the Chicago Surface Lines, who has kindly consented to present the report of this committee for Mr. C. W. Wilson, in the latter's absence.

[Mr. McIlraith then presented the report of the committee which is printed here in full as follows:]

REPORT OF THE COMMITTEE ON THE MOVEMENT OF THE VEHICLE

FOREWORD

Communities and transportation agencies are more keenly aware than ever before of the fact that increasing private automobile usage presents a great and permanent problem. The country as a whole finds itself today still mobilizing its means for understanding and coping with the difficulties encountered. Institutions of learning and business institutions through their research organizations are taking prominent parts in the discovery, development, and interpretation of pertinent facts. Communities, through their public authorities, in increasing numbers, are calling upon these institutions to conduct investigations and to cooperate with specialized municipal departments devoted to traffic problems. The energy and the thought devoted to this subject by the American Electric Railway and the Transportation and Traffic Associations during the past years is well known. Local urban transportation companies are expanding their facilities in an effort to do their part. A vitalized consciousness of the magnitude, permanence, and the influence upon society of the traffic problem is becoming more general and, what is even more important, there is a growing and more general realization of the necessity for a broader common understanding concerning possibilities for betterment and for greater cooperative effort.

It will be noted in this report that frequent references are made to the Transportation and Traffic Association report for 1929 on *The Movement of the Vehicle*, and that it in turn refers in a number of instances to the report for 1928 on *Service Betterment*. Your Committee wishes to refer to both of these reports in their entirety and to recommend their careful review.

The report of your Committee, herein submitted, discusses topics as follows:

(1) *The Private Automobile*.--For the past 25 years, transportation companies have watched the use of the private automobile grow. It has absorbed their revenues and has interfered with their operations. Guesses as to the future trend of such competition have been continuous, but, due to the fact that the effects of what is referred to later on as the "Automotive Revolution" are still unfolding and that tangible elements which might be used as dependable measures have been and are few, definite forecasts of value can scarcely be made. Your Committee has endeavored, however, to collect what data are available and to make such comments upon the trend of automobile usage as seem to be indicated.

(2) *Parking*.--On page 13 of the Transportation and Traffic Association Proceedings for 1929, in the report on *The Movement of the Vehicle*, there begins a discussion of elements of parking control and a most revealing account, as an example, of a parking control study in Chicago. The value of that contribution and the pressure of the

growing problem prompted the request that the study of parking be continued in this study. This your Committee has done, endeavoring to include as wide a geographical scope as possible, and has referred to such specific experiences as appeared to be valuable.

(3) Signals and Traffic Control.—The study on signals and traffic control is a continuation of that begun by the Committee on the Movement of the Vehicle in 1929.

(4) Equipment.—The study of equipment is also a continuation of the work done in 1929. The importance of improved design and of new equipment cannot be over estimated. However, that phase of the subject of equipment is in the hands of another committee. The competitive pressures put upon the performance of street railway equipment are not only severe but they are immediate. They will not wait. New equipment has to be acquired slowly. Your Committee has, therefore, devoted its attention to study of betterments to equipment now in service which may enable it to more nearly meet the competitive demands made upon it.

THE PRIVATE AUTOMOBILE

Historians may well refer to the first quarter of the present century as the period of the automotive revolution. Assuredly there have been few changes in the history of transportation or of mechanical development that have wrought such spectacular and revolutionary effects in personal habits and in social structure. The individual has been given a flexible mobility which had never before been imagined. The habit of rapid movement over great distances has become a national characteristic. This freedom of movement, combined with the collateral development of automotive machinery of labor and burden, has made possible the liberation of millions from farm labor and their concentration in industrial and commercial centers. The pattern of population distribution within the cities themselves has been materially altered from what it would have been had there been a complete dependence upon collective transportation agencies.

The rapidity with which this change has taken place is best shown by the figures of automobile registration in the United States. See Table 1.

THE FUTURE OF AUTOMOBILE REGISTRATION

In an age of such rapid and spectacular mechanical development, forecasts as to the future use of any particular mechanism are hazardous. There appears to be nothing at the present time, however, to invalidate the conclusion that the motor car will continue its increase to a point of saturation, and from that point on increase in number in ratio to population.

Reference to Table 1 will indicate that for passenger automobiles the rate of annual increase has steadily declined since the year 1923. It may be that a point of saturation under present economic conditions

TABLE I.—MOTOR VEHICLE REGISTRATIONS¹
1895-1928, AS OF DECEMBER 31ST

Years	Passenger Cars		Motor Trucks		Total Motor Vehicles	
	Number	Per Cent Increase	Number	Per Cent Increase	Number	Per Cent Increase
1895	4	.....	.....	.....	4	.....
1896	16	.....	.....	.....	16	.....
1897	90	.....	.....	.....	90	.....
1898	800	.....	.....	.....	800	.....
1899	3,200	.....	.....	.....	3,200	.....
1900	8,000	.....	.....	.....	8,000	.....
1901	14,800	85	.....	.....	14,800	85
1902	23,000	55	.....	.....	23,000	55
1903	32,920	43	.....	.....	32,920	43
1904	54,590	66	410	.....	55,000	67
1905	77,400	42	600	46	78,000	42
1906	105,900	37	1,100	83	107,000	37
1907	140,300	33	1,700	55	142,000	33
1908	194,400	38	3,100	82	197,500	39
1909	305,950	57	6,050	95	312,000	58
1910	458,500	50	10,000	65	468,500	50
1911	619,500	35	20,000	100	639,500	36
1912	902,000	46	41,400	107	944,000	48
1913	1,194,262	32	63,800	54	1,258,062	33
1914	1,625,739	36	85,600	34	1,711,339	36
1915	2,309,666	42	136,000	50	2,445,666	43
1916	3,297,996	43	215,000	58	3,512,996	44
1917	4,657,340	42	326,000	52	4,983,340	42
1918	5,621,617	21	525,000	61	6,146,617	23
1919	6,771,074	21	794,372	51	7,565,446	23
1920	8,225,859	22	1,006,082	27	9,231,941	22
1921	9,346,195	14	1,118,420	18	10,464,715	13
1922	10,864,128	16	1,375,725	16	12,239,853	17
1923	13,470,608	24	1,612,569	17	15,092,177	23
1924	15,466,649	15	2,134,724	32	17,595,373	17
1925	17,512,638	13	2,441,709	15	19,954,347	14
1926	19,237,171	10	2,764,222	13	22,001,393	10
1927	20,219,224	5	2,914,019	5	23,133,243	5
1928	21,379,125	6	3,113,999	7	24,493,124	6

¹ From 1929 edition of *Facts and Figures of the Automobile Industry*, p. 5, issued by the National Automobile Chamber of Commerce.

has been nearly, if not altogether, reached at the present time, and that unless there are marked shifts in these conditions future increase in registrations will be proportionate to population increments.

Favorable economic conditions in the future, however, may result in a much lower ratio of population to automobiles than that which now exists. Several states are approaching three persons per vehicle. On the assumption that this ratio may prevail generally in the future, and in view of normal population increases, the end of the century may show 72,000,000 motor vehicles in use, or approximately three times the present registration. A curve of this latter forecast is shown in the accompanying Fig. 1, prepared by the Detroit Rapid Transit Commission.

Even in view of the most liberal estimates for the future, it would seem apparent that no possible developments can have an acute effect upon urban life or upon transportation habit, as have been shown during the past two decades of spectacular automobile absorption. It would appear that a point of balance with respect to transportation distribution in cities had been reached and that the future may show increases in all fields on the percentage of total now carried.

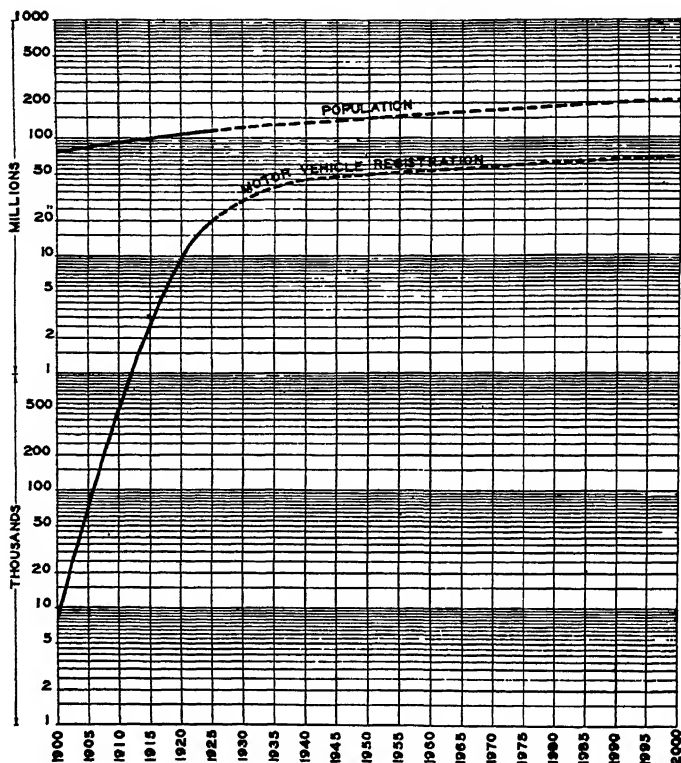


FIG. 1 — RELATION OF MOTOR VEHICLE REGISTRATION TO POPULATION IN THE UNITED STATES

1900-1925 United States Census and Government Reports 1925-2000—Forecast. Rapid Transit Commission, Detroit, October, 1927.

THE EFFECT OF THE PRIVATE AUTOMOBILE ON COLLECTIVE TRANSPORTATION IN CITIES

There is a widespread and probably justifiable conclusion that the development of the private automobile has served as a powerful competitive influence to the expansion of collective transportation in cities. The situation is complicated, however, and surface indexes may be misleading. It is impossible to determine what might have been the condition of public carriers in cities today had the motor car not been developed. Would there have been the same tendency toward the urbanization of the population? Would cities have developed widespread residential districts, with their special transportation requirements? Would the concentration of large working populations in central business or

industrial districts have been possible to the same degree without automotive vehicles. What effect has the automobile already had, and what effect will it have in the future in its tendency to make people intolerant of walking?

Even though these qualifying factors may be of substantial importance, there can be little doubt that the automobile has absorbed a very considerable portion of increased transportation business that might otherwise have gone to collective carriers.

While the examples may not be typical, the trends shown in Fig 2, taken from a report of the Detroit Rapid Transit Commission, are interesting.

The exact measure of this competitive influence in any individual community, or in any group of communities, is difficult to ascertain. If the competition is direct, one might expect to find that in those cities with the largest number of automobiles per thousand population the per capita riding habit on street railways would be smallest. Attention is called to Table 2, where per capita riding habit and automobile registration are presented.

TABLE 2.—COMPARISON OF PER CAPITA RIDING AND AUTOMOBILE OWNERSHIP¹

City	Population Served	Revenue Rides Per Capita	Automobiles Per 1,000 Population
New York	6,217,260	485	74.7
San Francisco.....	576,000	461	198
Chicago	3,102,800	376	128.9
Toronto	595,628	331	137.2
St. Louis	832,000	324	170
Boston	1,220,434	301	125
Baltimore	855,000	265	185.8
Cincinnati	459,500	244	185.8
Milwaukee	589,000	241	227.6
Detroit	1,565,100	240	246.1
Kansas City	500,000	239	231.8
Cleveland	1,111,317	236	187.6
Atlanta	317,100	235	169.3
Richmond	191,890	221	78.1
Pittsburgh	1,290,000	205	138.9
Memphis	205,700	201	219.1
Winnipeg	305,000	197	80.8
Des Moines	148,900	192	217
Omaha	219,200	180	203.2
Portland (Oregon)	354,608	168	223
Denver	327,175	162	216.5
Houston	259,000	159	200
Lexington (Kentucky).....	60,312	105	177.1

¹ Figures collected by the Beeler Organization, *Electric Railway Journal*, November, 1929, p. 1032.

In general these figures would appear to support the conclusion that in those communities with large automobile registrations the per capita riding habit is relatively low. There are a sufficient number of exceptions, however, to raise a question as to the complete validity of the conclusion. Thus, for example, San Francisco with a per capita riding habit of 461—second only to that of New York—has 198 automobiles

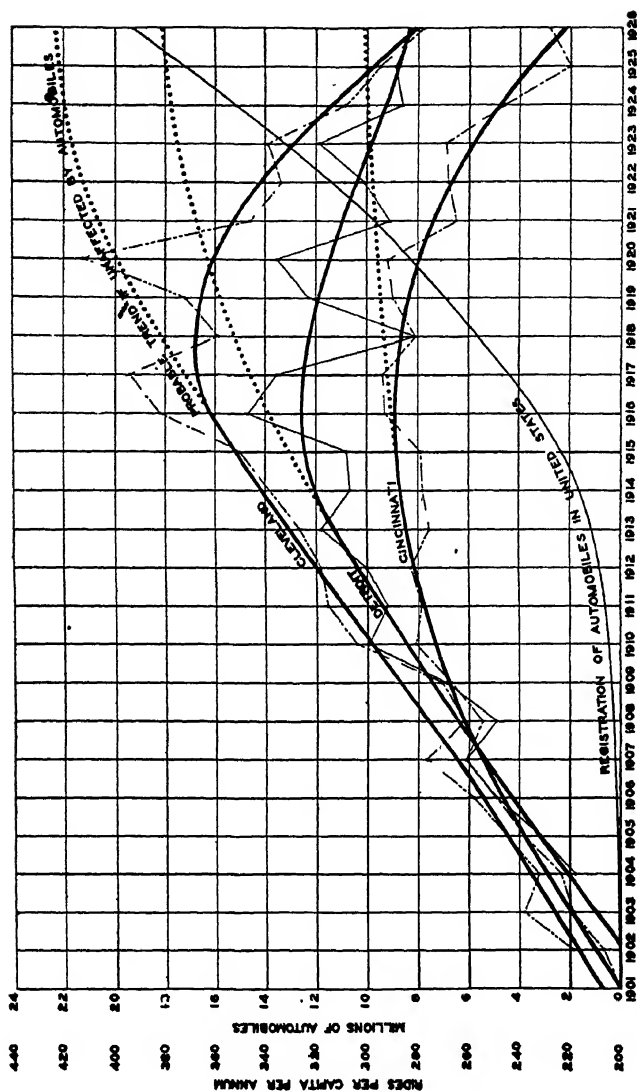


FIG. 2—TREND OF COLLECTIVE RIDING HABIT BEFORE AND AFTER DEVELOPMENT OF THE AUTO-MOBILE, YEARS 1901-1926

Rapid Transit Commission, Detroit, October, 1924

per 1,000 population; while Winnipeg, with a relatively low riding habit of 197, also has a very low automobile registration of 80 per 1,000 population. While the number of motor vehicles may be of importance as a competitive factor, there are other elements which may easily be even more controlling in their effect.

One of these collateral elements would assuredly be automobile use rather than gross numbers. Unfortunately, facts have not been developed for individual communities by which the amount of automobile use can be determined with confidence. It is a well known fact that the amount of annual mileage per automobile registered varies materially in various cities. Even in the absence of adequate facts, it is probably correct to say that mileage per private automobile owned is less in the larger metropolitan centers than in the smaller cities; that it is less in the northern and eastern cities than in the southern and western cities; and that with the tendency toward greater congestion and toward two or three car ownership, actual use per car will not increase in the future with the same rapidity as gross registration. Estimates of passenger miles by various methods of transportation in the United States are shown in Fig. 3.

Another competitive factor worthy of consideration is the character of the service given by the collective transportation agencies. While there has been a marked general tendency toward a decline in riding habit in those cities with ordinary surface facilities, the same tendency has not been shown in those cities that have developed an effective rapid transit system. Attention is called to Fig. 4 and 5, where conditions in the two classes of communities are shown.

Upon this factor a member of the Committee submits the following observation:

"There are instances in this section (Chicago) where electric railways paralleled by very good highways have enjoyed a remarkable growth in patronage, regardless of the usage made of these highways by passenger automobiles. An outstanding example would be the electrified Illinois Central suburban service, whose business has increased more than 200 per cent since it was electrified and modernized and, at the same time, this road is paralleled by the best and fastest automobile road within the city of Chicago. Perhaps one of the most important factors in the relief of traffic congestion in concentrated areas is the development of adequate and fast public transportation facilities."

CHARACTER OF AUTOMOBILE COMPETITION

Information is not available to make possible a complete analysis of the exact character of competition offered by the private automobile. An analysis recently made by the Boston Elevated Railway may not be without general interest, however. This study reveals the fact that since 1917, normal week-day business has remained at approximately the same volume, but that there has been a decline in Saturday business, and much more marked declines in Sunday and especially in holiday

business. Studies in other communities may reveal similar trends. If this is a typical situation, it is apparent that the effects of automobile competition are most concentrated on recreational business. The Boston study is shown in Fig. 6.

A corollary of this situation would be the relation between the street car and the private automobile in the transportation of persons to and from business districts of cities in comparison with outlying local or recreation traffic. In this particular competitive field, it does not appear impossible that the street car may be able to increase materially its importance, as it has in certain instances even in the face of rapid increases in automobile traffic. Attention is called to Fig. 7 and 8 showing increases in street railways and automobile traffic in the central business district of Pittsburgh.

With respect to central business district traffic, collective carriers have been able to retain a large percentage of the total transportation, even in face of the full competition offered by the private automobile. The situation as shown in selected cities by the latest available figures is illustrated in Table 3.

TABLE 3—DISTRIBUTION OF CENTRAL DISTRICT TRAFFIC BY VARIOUS MEANS OF TRANSPORTATION
(All figures in per cent)

	<i>Passenger</i>			
	<i>Street Car</i>	<i>Automobile</i>	<i>Walk</i>	<i>Others</i>
San Francisco	45	16	30	9
Pittsburgh	52	21	15	12
Boston	49	25	14	12
Chicago	77*	19	Not Checked	4

* Includes elevated and interurban trains.

With respect to rush hour traffic, it would appear that the mass transportation facilities have retained an even more important percentage of central business district traffic. In Table 4, percentages are given for several cities as computed by the Rapid Transit Commission of Detroit.

TABLE 4—AFTERNOON PEAK HOUR PER CENT OF TOTAL PASSENGERS CARRIED

	<i>Autos and Taxis</i>	<i>Collective Facilities</i>
Detroit	28.40	71.60
Los Angeles	32.50	67.50
St. Louis	19.40	80.60
Baltimore	18.90	81.10
Cleveland	19.10	80.90
Newark	13.60	86.40

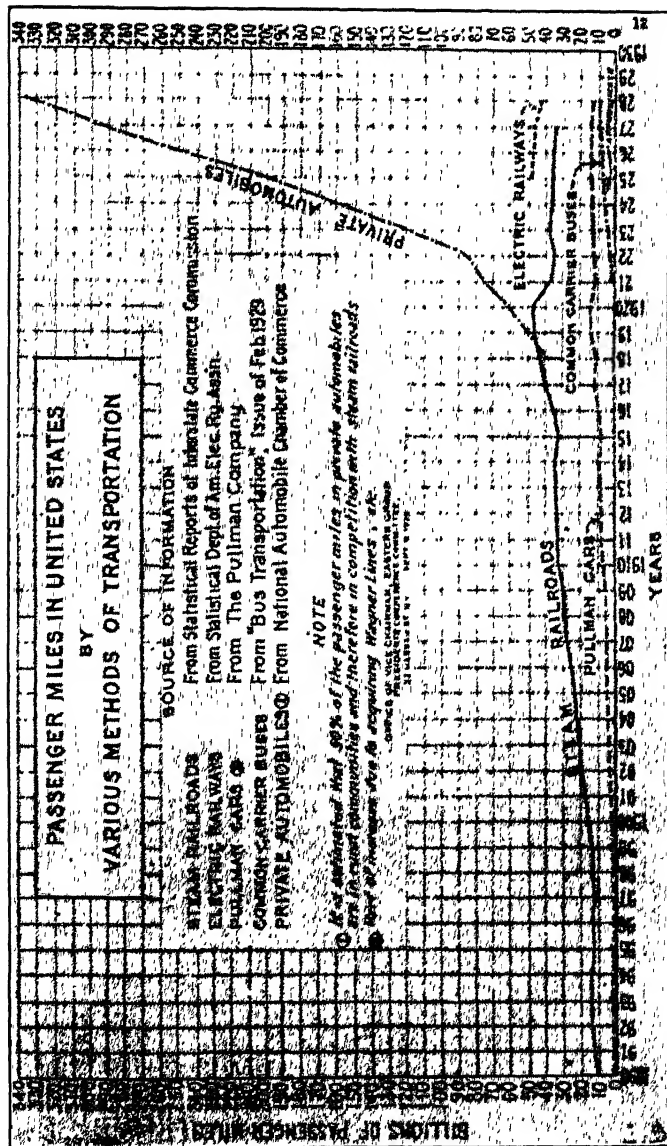


FIG. 3.—PASSENGER MILES IN THE UNITED STATES BY VARIOUS METHODS OF TRANSPORTATION

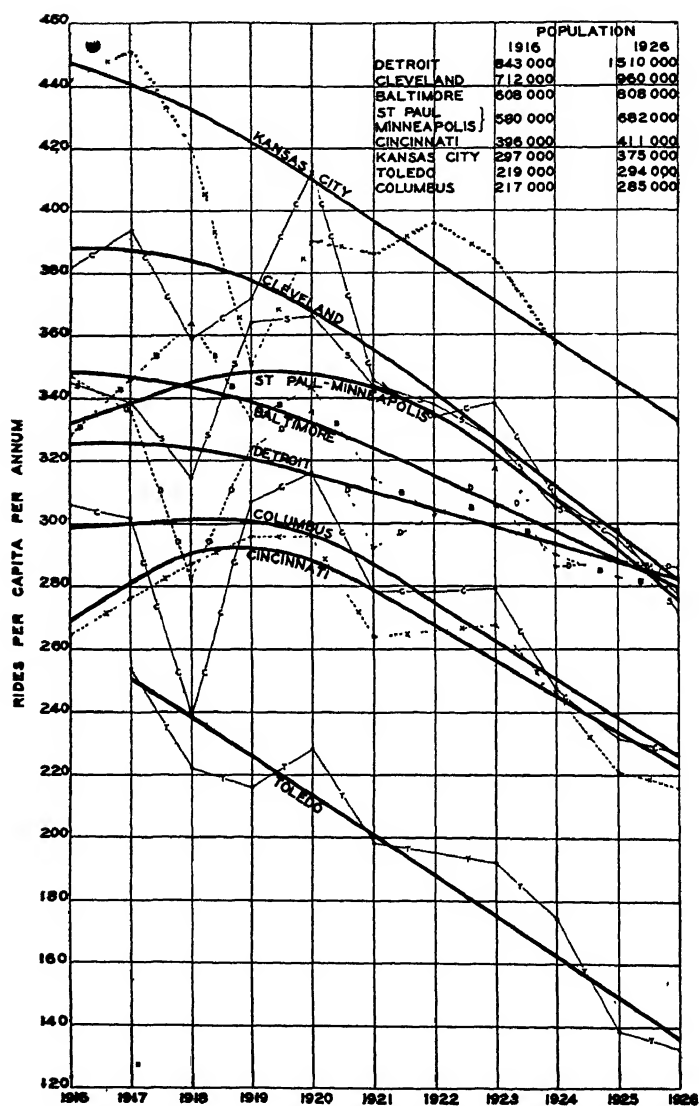


FIG. 4—TREND OF RIDING HABIT ON PUBLIC TRANSPORTATION FACILITIES IN CITIES WITHOUT RAPID TRANSIT, YEARS 1916-1926
 Rapid Transit Commission, Detroit, July, 1927

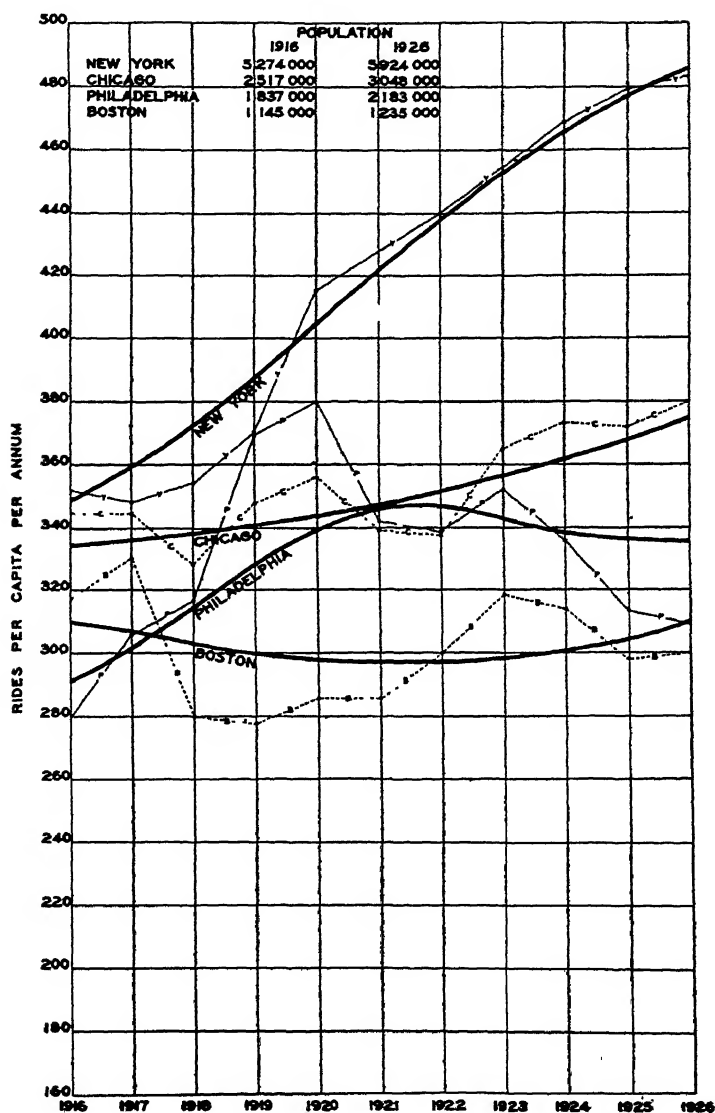


FIG. 5—TREND OF RIDING HABIT ON PUBLIC TRANSPORTATION FACILITIES IN CITIES HAVING RAPID TRANSIT, YEARS 1916-1926
Rapid Transit Commission, Detroit, July, 1927

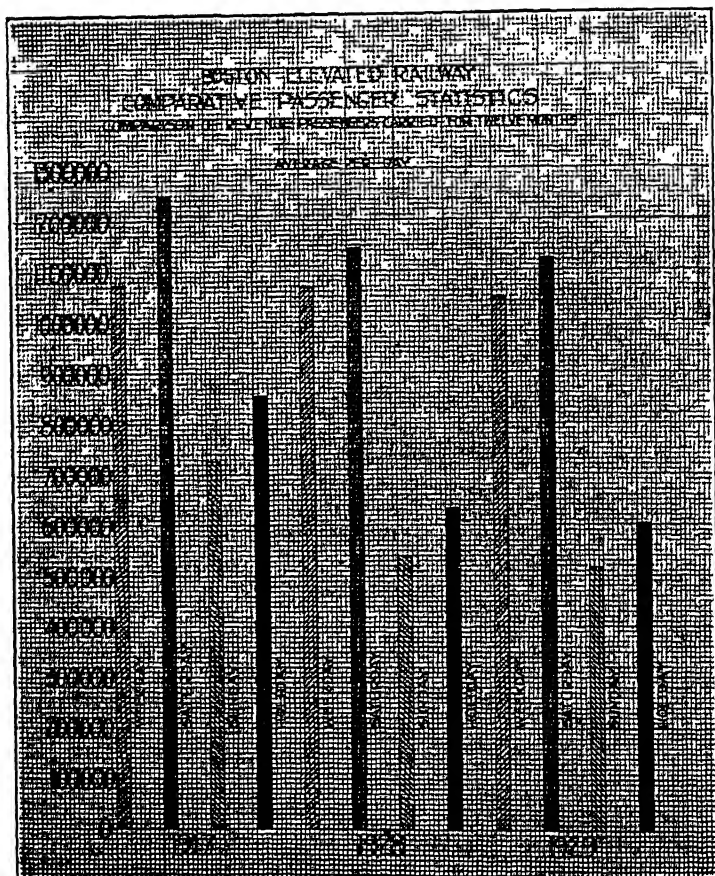


FIG. 6—VARIATION OF PASSENGER TRAFFIC FOR WEEKDAYS, SATURDAYS, SUNDAYS AND HOLIDAYS — BOSTON ELEVATED RAILWAY

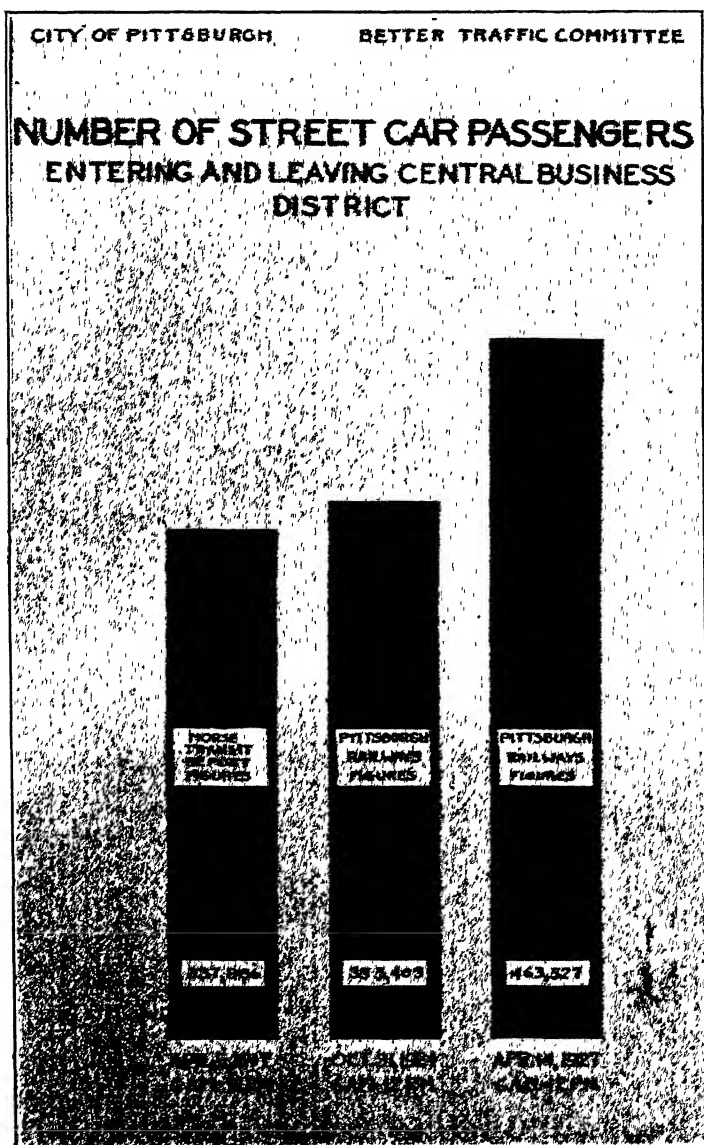


FIG. 7—INCREASE IN STREET CAR PASSENGER TRAFFIC FROM 1917 TO 1927—PITTSBURGH RAILWAYS COMPANY

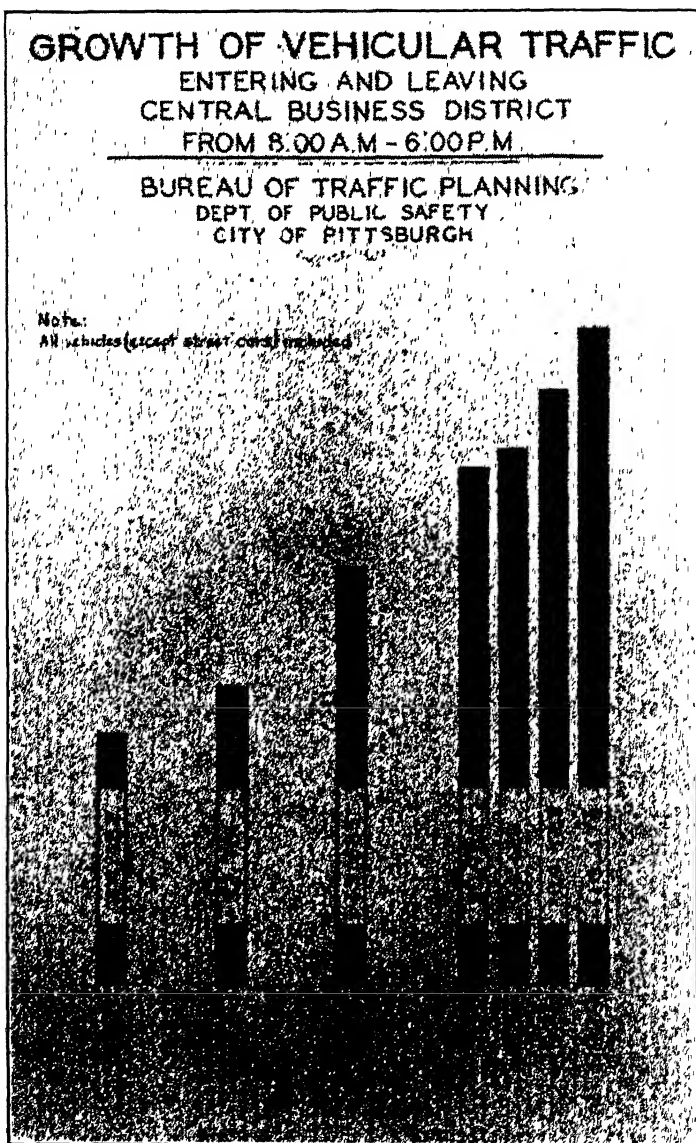


FIG. 8—INCREASE IN VEHICULAR (OTHER THAN STREET CAR)
 TRAFFIC FROM 1917 TO 1929—CITY OF PITTSBURGH, PA.

COMPETITIVE FACTORS FROM THE VIEWPOINT OF THE POTENTIAL USER

Without in any manner attempting an exhaustive analysis or evaluation of transportation facilities, the Committee desires to set forth a classification of the competitive factors of the private automobile and the street car from the standpoint of the potential user. These items may serve as a check list for operators desiring to analyze their competitive problems.

Speed: In connection with this important factor, the private automobile possesses a general advantage. It is an advantage, however, which is definitely threatened by congestion in the central districts of practically all cities and along many important radial routes. Congestion tends to equalize the operating speeds of street cars and automobiles. The street car, however, labors under the handicap of service stops. Better loading facilities, express service, and skip-stop operation can lessen this handicap materially. With respect to increasing street car operating speed, rapid transit, where feasible, would achieve best results although surface cars of relatively high speed are in actual operation. It should be borne in mind, however, that this rapid transit will normally tend to increase automobile speeds by reducing street car surface traffic, and that in many cities it may be balanced by the construction of express highways for motor vehicles.

Terminal Convenience: In connection with the beginning of the inbound trip, it is probable that for the majority of users the automobile possesses an advantage. This advantage increases with the distance from the nearest street car stop and with longer headways in car service. The completion of the inbound trip normally shows a terminal advantage in favor of the street car, if it carries the rider near his destination. He may leave the car at the proper stop and his connection with it is severed. The automobile must be parked. It is probable that the prohibition of parking in central districts, and the construction of conveniently located terminal garages may lessen the advantage possessed by the street car in connection with this factor.

Riding Comfort: Riding comfort is composed of several elements. In connection with the amount of energy expended, the street car usually has a marked advantage. Assuming that the passenger can obtain a seat, he may read or spend his time in any way he may desire. If he is unable to obtain a seat, the energy expended may be materially greater than that demanded of an automobile driver. While the energy demanded of an automobile driver undoubtedly exceeds that of a seated street car rider, it is normally not of an onerous character, and by some persons is enjoyed as a recreation or sport.

Personal safety as a feature of riding comfort shows a marked advantage in favor of the street car. This advantage is of a comparatively abstract character, however, so far as the average individual's thought is concerned, and is probably of less immediate appeal than physical comfort.

Physical comfort shows a marked advantage in favor of the motor car, under normal conditions. Even the lowest priced motor vehicles are designed and equipped to give far more comfort, and even luxury, than is to be found in the typical street car. Freedom from crowding, comfortable upholstery, free vision, individual control over heat and ventilation, are among the special advantages of the automobile.

Selection of Routing: On any particular trip, a rider may desire to reach several destinations. Flexibility of routing in order to accomplish this end is a definite advantage in favor of the automobile.

Cost: In respect to cost as a competitive factor, the street car has a notable advantage over the automobile, and probably one which will increase rather than lessen, even with increased fares in the future. Additional charges for intown storage will be inevitable for the great majority of automobile users. Cost factors are of importance to commercial organizations that must select and pay for transportation of employees, and they are likewise of importance to those who may be called marginal automobile users, that is, those barely able to pay for operating costs. Cost is not a matter of pressing importance to the average automobile user, however, for the real costs are frequently hidden or charged against some other item than personal transportation for business. Or, if they are recognized, the individual may be willing to pay the extra charge for what he considers a valuable service.

CONCLUSION

It is too early in the development of the automobile, and facts are too inadequate to draw definite conclusions with respect to the ultimate competitive effects of the private automobile on collective transportation. It would seem clear, however, that the period of very rapid automobile expansion, as witnessed during the past decade, is drawing to a close. This does not mean that the number of automobiles in use in cities may not steadily and very materially increase in the future. The implication is, however, that a balance is being approached and that such increases as do take place may be in ratio to population increments. The conclusion is that the most severe aspects of automobile competition have now been felt by collective transportation facilities with respect to city transportation, and that the future may show a similar distribution to that now found, with some probable shifts toward collective transportation, with increases in street congestion and with improved transportation methods.

THE PARKING PROBLEM

The work of your Committee in connection with parking is a continuation of the study begun in 1929. Reference is made to "Control of Parking" page 13, Transportation and Traffic Association Proceedings in the report on The Movement of the Vehicle.

Parking has long been the most controversial phase of the traffic problem. If the past year shows any advance toward a solution of this aspect of traffic regulation, it is in a measurable recognition of the fact

that many of the agencies heretofore considered diametrically opposed have, in final analysis, a common interest.

The success of prohibited parking in the Chicago loop district and more stringent regulations in a number of American cities has caused many traditional opponents of parking control to question the validity of their position. More liberal ideas have been fostered by a tendency to look at the facts of individual street and parking conditions, as against holding rigidly to a general theory.

Even a casual consideration of the facts lying behind the parking situation reveals that all street users, and all who profit by street use, have essentially a common interest in any parking condition. The more complete the facts upon any given condition the more obvious becomes this common interest. Despite the numerous controversial factors of the parking problem, there are a number of basic principles which it is believed will be accepted by all who are interested in general public welfare.

These principles may be set forth as follows:

GENERAL PRINCIPLES CONTROLLING PARKING

(1) Parking is a privilege and not a right. This principle is good law as well as good business. There is a long line of judicial decisions substantiating the statement.

The ownership of a registered motor vehicle or the ownership of a piece of property abutting upon a public way does not give an individual an unlimited freedom of access. Access may not be destroyed, but the manner in which it is exercised is subject to regulations made in the interest of public welfare.

(2) As with other peaceful private uses of public ways, parking may be tolerated, and should be permitted, where it does not interfere with the right of the general public to use public ways for travel purposes.

(3) Where parking is permitted it should be regulated in such a manner as to promote safety, a minimum of interference with travel uses, and an equitable distribution of curb space available among operators of vehicles who desire to park.

(4) Where parking interferes with essential travel uses, the privilege should be modified, or if necessary, withdrawn.

COMMON INTERESTS IN THE APPLICATION OF SOUND PRINCIPLES

Automobile interests, merchant groups, property owners, and street railway operators can all subscribe to these principles with assurance that where accurately applied, they will result in the advantage of all concerned. It should be noted that where parking interferes with essential travel uses of public ways, it is quite as much to the interests of the automobile operators of the community that it be restricted, as it is to the operators of street railway property. The mutuality of interests may be clearly illustrated by a statement of the minimum parking regulation required for effective street railway operation. Parking should be permitted at no place where the parking vehicles regularly overhang

and obstruct the tracks. Such a minimum requirement might seem especially designed to facilitate street car movement, but actually it is of equal interest to automobilists. A street car obstructed by a parked vehicle blocks one-half of the roadway in such a manner that it is impossible for following vehicles to pass. They are obstructed as effectively as is the street car.

A less essential though desirable requirement is that parking should be prohibited where parked cars makes impossible the free movement of one line of vehicles between the street cars and the curb. Again such a requirement may seem of special favor to street car operation. Actually it is of equal advantage to automobilists. One of the fundamentals of traffic regulation to facilitate non-rail vehicular movement is that there should be an opportunity for such vehicles travelling in the same direction to pass one another, thus making possible a segregation of slow and faster moving units. Where traffic is comparatively light, the maintenance of a free line between the street car tracks and the curbing need not be insisted on, but where the absence of this free line would cause congestion, its maintenance should be made a cardinal point.

THE NEED FOR FACTS IN THE CONTROL OF TRAFFIC

The general principles set forth above, while generally accepted, cannot usually be applied with unanimity of consent in any particular community. This is due primarily to the fact that adequate information regarding parking and traffic conditions is not available. In the absence of such information, proposals for parking regulation merely give opportunity for excessive claims and recriminations.

The Committee is of the belief that the elements of mutual interest in the parking situation can be revealed and satisfactorily adjusted to the advantage of all parties concerned, if adequate facts are obtained and presented. This conclusion is substantiated by the fact that the prohibited parking regulation in Chicago, which is one of the most extreme parking rules ever applied, has been in effect for a period of more than two years with general public satisfaction, and has been able to obtain the support of substantial and varied business interests on every occasion when it has been attacked. This strength has resulted, without doubt, from the fact that prior to the installation of the regulation, exhaustive studies were made of every phase of the problem. All parties concerned knew where their interests lay. The operation of the rule was followed by similar studies to check the results.

The Committee especially recommends that during the present year street railway companies interest themselves in accurate and careful studies of parking problems in their own communities. Street railway companies have long been engaged in the study of transportation and related problems. Frequently they are the only agencies in their community which possess engineering personnel competent to conduct

analyses and present the necessary information. Activity in this field on the part of the operating companies will serve the dual purpose of showing to the companies themselves where their own interests lie in connection with parking and related subjects, and will likewise constitute a valuable contribution to the sound administration of traffic rules in their cities.

A DESCRIPTION OF PARKING STUDIES

Studies conducted in various cities during the past few years have developed an investigation technique which may be properly applied in any community. The Committee presents herewith descriptions of a series of studies and the methods whereby they may be successfully conducted, in the hope that many members of the industry will see the value, as some have already done, of conducting such investigations.

Physical and Legal Capacity of Curbs in the Central Business or other District: Fundamental to any intelligent consideration of a parking problem is a knowledge of the physical parking capacity of the curbs of the district, and the legal capacity obtained by subtracting legal restrictions from the gross curb length. No fixed rule can be given for the determination of the boundaries of the central or other district to be studied. Usually the boundaries are rendered self-evident by the character of business operations and by the density of traffic flow. The area of the district having been determined, the linear footage of the curbs in the district may be determined from any scale street map of the area.

Observations should be made of actual parking practices to determine the curb length commonly occupied by the average parked vehicle. This will be found to vary from fifteen to eighteen feet. Parking practices in various communities affect the length required. Division of the total curb length by the number of feet required by each car will give the result of the gross physical parking capacity of the district for parking.

Examination should next be made of all legal restrictions upon parking, such as fire hydrants, driveways, alleyways, reserved entrances to buildings, hotels, theaters, and similar structures, prohibited parking areas on the approach to intersections and opposite safety zones, and such street lengths in the district as may be generally prohibited to parking. By dividing the space required to park the average vehicle by the gross restricted footage and by subtracting the result from the total physical parking capacity of the district, the actual legal parking capacity is obtained. This computation generally reveals that the actual parking capacity of the district is much less than generally believed. Thus, for example, studies of this character conducted in Chicago revealed a physical capacity in the loop district of 3,863 vehicles, but an actual legal capacity prior to prohibited parking, of but 1,157 vehicles.

A complete computation of this type of study is illustrated in the following table:

TABLE 5—PARKING CAPACITY OF A CENTRAL BUSINESS DISTRICT¹

Total linear curb space in the district.....	107,837 feet
Space required for each parked car.....	18 feet
Physical parking capacity of the district	5,964 cars
Legal restrictions:	
No-parking streets	33,370 feet
Twenty foot rule.....	7,042 feet
Hydrants	2,543 feet
Taxi stands	2,560 feet
"T" intersections	2,271 feet
Building entrances	250 feet
Reserved space	1,619 feet
Total legal restrictions	49,655 feet
Balance available for parking.....	58,182 feet
Capacity of balance.....	3,233 cars

¹ The Erskine Bureau, *The Street Traffic Control Problem of the City of Boston*, 1928, p. 155.

Where conditions are sufficiently important to warrant the effort, it is recommended that the various legal restrictions be indicated by symbols in their proper positions on the district street map.

Study of Parking Load: It is essential to proper regulations to know the actual demand on the parking facilities available, in other words, to determine the actual parking load thrown upon the district on typical business days. This study may be accomplished in one of several ways according to the desires of the operators. If it is desired to determine the load at any one particular time, for example between the hours of 12 noon and 2:00 p. m., a check can be made by sending vehicles with observers over each street in the district and recording on a map the number of vehicles parked in each block.

If, on the other hand, it is desired to determine the varying load through the hours of the day, a more detailed type of study is required. This has been successfully conducted by dividing the district into blocks or areas which can be covered by an observer within a fifteen or thirty minute period according to the detail desired. Where the block method is used, the observer circles the block each period, recording the number of vehicles parked during each period.

A typical computation made from this type of study is shown in the following Table 6:

TABLE 6 — PARKING LOAD IN THE CENTRAL BUSINESS DISTRICT¹

<i>Period ending</i>	<i>Total parked</i>	<i>Percentage of potential space used</i>
8:20	653	33
8:40	1,000	50
9:00	1,351	67
9:20	1,747	87
9:40	1,849	92
10:00	1,912	95
10:20	1,943	97
10:40	1,985	99
11:00	1,985	99
11:20	1,938	96
11:40	1,961	98
12:00	1,959	97
12:20	1,996	99
12:40	2,031	101
1:00	2,014	100
1:20	2,107	100
1:40	2,000	100
2:00	1,965	98
2:20	1,959	97
2:40	1,962	98
3:00	1,963	98
3:20	1,972	98
3:40	1,961	98
4:00	1,925	96
4:20	1,976	98
4:40	1,950	97
5:00	1,953	97
5:20	1,772	88
5:40	1,558	77
6:00	1,307	65
<hr/>		
Total car periods of 20 minutes each.....	54,564	
Average	1,819	90%

¹ The Erskine Bureau, *The Street Traffic Control Problem of San Francisco*, 1927, p. 153.

Studies to Determine Parking Habits: The study described above for determining parking loads during various periods of the day may be combined with observations to determine the various characteristics of parking, as for example, the length of time each car is parked; and any

violation which may be committed, such as parking in a prohibited area, parking by a fire hydrant, parking in front of a driveway, parking in front of an entrance to a building, at a loading zone, at an improper angle to the curb, too far from the curb, or parking in a double line. A successful and simple method of making such a study is by the use of recording cards. Cards are printed containing a space for the registration number of each vehicle, a check list as to the type of vehicle, a space for entering the period of the observation (i. e., 8:00-8:30 A. M.) and a list of the typical violations noted above with space for checking offenses. The observer fills out one card for each vehicle parked in his area during each period of the observation. It is apparent, of course, that by arranging the cards serially according to registration numbers for each district, at the completion of the count, the identical registration numbers will be thrown together, and where there is an unbroken time sequence, it will indicate that the vehicle was parked uninterruptedly during the period of the sequence. The computation of types of violations of parking regulations is easily made from the checks placed on the cards. This study of time and manner of violations is valuable to indicate current practice with respect to length of parking and the effectiveness of enforcement with respect to time limits and other parking regulations. Studies of this kind have occasionally revealed that districts are overrun with all-day parkers who are of negligible benefit to business and who should be restricted by suitable time limits or excluded entirely.

The computation of data covering manner of violation is illustrated in Table 7 following:

TABLE 7—TYPES OF PARKING VIOLATION¹

<i>Types</i>	<i>Number of Violations</i>	<i>Per cent</i>
Improper angle	763	13.75
Wrong direction	11	0.20
No parking zone.....	1500	27.03
Fire plug violation.....	114	2.05
Too far from curb.....	931	16.78
Left side one-way street.....	1421	25.61
Double line	102	1.84
Parked overtime	707	12.74
Total violations	5549	100.00
Total cars observed.....		4666
Cars parked contrary to law.....		3886
Per cent contrary to law.....		83.28
Violation per car observed.....		1.403

¹ McClintock and Bartholomew, *The Street Traffic Control Problem of New Orleans*, 1928, p. 146.

The Effect of Parking on Vehicular Traffic Movement: Having obtained figures with respect to parking capacity and the manner in which such capacity is utilized, attention may be turned next to the effect of parking on vehicular traffic movement. Parking interference is of importance to the drivers of vehicles as well as to operators of street cars and, as has been indicated, affords a point of common interest between the two groups.

It is necessary to design various types of studies for different districts. One study of this factor which is generally applicable is the so-called obstruction study. It is made by operating a test vehicle over the streets of the district, making careful record of the time elapsed between each intersection and the causes of any delays encountered, with special relation to parking obstructions in connection with this particular study. These observations will reveal the degree to which vehicular traffic is impeded by parking, and serve as a very valuable basis for subsequent comparisons with conditions under whatever parking restrictions or prohibitions may be applied.

A secondary study of the relation between parking and vehicular movement is to be found in a study of the operating conditions of commercial traffic. Observations of this character can readily be made by stop-watch checks by observers travelling upon commercial vehicles making deliveries in the district. Note should be made of the delays in movement on account of parking, and especially of delays in reaching curbs and loading areas.

Effect of Parking on Traction Movement: A study of traction movement in relation to parking is comparable to the study of vehicular movement. It will usually be desirable, however, to make a somewhat more elaborate study. Reference is made to a very useful study of this kind conducted by the Los Angeles Street Railway in conjunction with the Los Angeles Traffic Commission. Observations covered twelve lines operating in the central district, with as many as twenty observation trips on each line during definite periods of the day. Observers with stop-watches recorded the time of entering the district, the time of leaving the district, with a computation of the average over-all speed. Stop-watch records were made of other operating conditions as revealed in the summary in Table 8:

TABLE 8—STREET CAR DELAY STUDY IN THE CENTRAL BUSINESS DISTRICT¹

Average overall speed.....	6.3 m. p. h.
Average running speed.....	10.2 m. p. h.
Delay in per cent of total operating time.....	38.8 per cent

(Table continued on next page)

¹ From a report of the Los Angeles Traffic Commission, prepared in cooperation with the Los Angeles Street Railways, 1927.

Segregated delays in per cent of total delay

Signal or officer ²	54.5 per cent
Loading passengers	33.3 per cent
Street car traffic.....	5.9 per cent
Vehicular traffic	5.4 per cent
Parking	0.6 per cent

² Computed as the time the street car was required to remain standing by officer or traffic signal after loading and unloading was completed at any stop.

It is apparent, of course, that no street car operator can give intelligent consideration to the relation of his own operations to parking unless accurate facts of this character are developed. When the delays are recorded block by block in the district, they show not only types of delays but, likewise, the precise location of the relative operating conditions between various lines and between street lengths in the district.

Parking with Relation to Business: Information with respect to the contribution made by curb and other parking to business activity in any district is of as much interest to the street railway operators as to the merchant. Healthy transportation conditions depend upon business activity and prosperity. Regulations and restrictions injuring business though favoring in some manner railway operating conditions would normally be detrimental to street railway prosperity. Incidentally, it should by no means be assumed that prohibition of parking in any particular district will necessarily lead to the transfer of a volume of traffic equal to that excluded from curb parking, from automobile transportation to street car transportation. The anticipation set forth in the Chicago traffic survey prior to the prohibition of parking in the loop district, that "greater freedom of traffic movement (resulting from prohibited parking) will attract automotive patronage which, to some extent, has been discouraged from entering the district" was fully substantiated in that the first eighteen months of prohibited parking in the loop district showed an increase in automobile traffic in excess of 22 per cent. This was an increase much greater than that experienced by any other transportation agency.

It is possible to determine with a high degree of accuracy the amount of business contributed by various modes of transportation and, with respect to automobile transportation, by the various types of parkers. There are three methods which have been used successfully to determine these factors.

The *first* may be called the "interview method" which was first used in the metropolitan street traffic survey conducted by the Chicago Association of Commerce. By this method, all the larger retail establishments and many of the various smaller stores cooperating with the survey, appointed representatives to interview patrons upon entering the store as to the means of transportation they had used on that particular day in coming to the central district. The answers were recorded in

columns representing the various modes of transportation. If the answer was that the motor car had been used, the further question was asked a to whether it had been parked in a garage, at the curb, or was in charge of a chauffeur.

The *second* method may be called the "ballot method" and has been used successfully in both Boston and San Francisco. According to this plan, the cooperating stores hand patrons entering the establishments ballots with tabs on which are printed the various modes of transportation with the special questions relative to automobile parking. The patron removes the tab bearing the correct answers and deposits it in the ballot box as he leaves the store.

The *third* method is known as the "sales check" and has been used for the first time in Kansas City. It has the advantages of the other types of studies and the additional one that it reveals the relative purchasing powers of the various types of transportation patronage. According to this method, special check lists are provided for each sales person in each cooperating establishment. At the completion of the sale, the sales person asks the patron how he or she came to the central district on that particular day. The sales person then enters the amount of the sale in the proper column and thus, not only is the mode of transportation revealed, but likewise the average purchase of each type of transportation patron. While this type of study is somewhat more difficult to make and to compute, it is nevertheless far more revealing and is preferred to the other methods. If the merchants can be convinced of the sincerity of the sponsoring agency and of the confidential use of the information revealed, there is usually no hesitancy in participating in the studies.

The results of a study of this type are illustrated in the following Table 9:

TABLE 9—PATRONS ARRIVING BY VARIOUS MEANS OF TRANSPORTATION¹

	<i>Number</i>	<i>Per cent</i>
Total patrons interviewed.....	96,082	100.00
Suburban trains	18,742	19.5
Elevated trains	34,419	33.8
Street cars	25,191	26.2
Motor coach	10,980	11.4
Taxicabs	1,092	1.1
Automobiles	7,662	8.0
Parked at curb.....	1,505	1.5

¹ The Erskine Bureau, *Metropolitan Street Traffic Survey of Chicago*, 1926, p. 159.

Recommended Procedure for Parking Studies: The foregoing studies cover the principal factors necessary for an intelligent determination of the parking policy which should be followed in any community. There

are other collateral studies of much greater detail which have utility for the determination of special conditions.

Again, the Committee emphasizes the necessity for the street railway industry to offer its full technical cooperation in the collection and presentation of accurate facts upon local parking requirements. The confidence of the various parties affected will be increased if their representatives are invited to participate in the design and management of the studies, and if these parties are invited to assist in the collection of materials.

While each community has its special local parking problems which can be solved effectively only by a knowledge of local conditions, there are certain general principles which have universal validity. These can be determined and established only by a factual knowledge of conditions in communities widely differing in size and character. In order that comparable data may be collected in a uniform manner for this purpose, the committee recommends that the technical staff of the American Electric Railway Association prepare uniform procedure, forms, and computing methods for parking studies so that these may be available for any company desiring to use them.

SPECIAL PARKING RESTRICTIONS

The Committee desires to call attention to several types of special parking restrictions which have proved effective in increasing the facility of all street traffic movement, and at the same time have resulted in a minimum disturbance of curb parking habits.

Loading Zones: A loading zone is a curb area which is reserved for the exclusive use of vehicles standing for the purpose of actually loading or unloading passengers or merchandise. It is for general automobile traffic what the bus stop or the safety zone is to public carriers.

Without the provision of loading zones in busy districts the entire curb area is normally occupied by time limit parkers. Passenger vehicles desiring to drop or pick up a passenger are unable to reach the curb. The alternative is to stop in double line. This procedure obstructs an entire useful lane for traffic movement, and on narrow streets often blocks street cars, and all following vehicular traffic. On wider streets it forces traffic onto the tracks to the mutual inconvenience of automobile and street car traffic.

The situation is even more serious with respect to the operation of commercial vehicles. Truck drivers must often stop near the point of delivery or pickup if heavy material is to be handled. Thus, even though curb space may be available at some other place in the block, it is often of no use. Obstruction offered by double parked trucks may appear justifiable to the driver, if conveniently located curb space is not available. The inconvenience is great, however. Goods cannot be handled effectively from trucks in such a position. The obstruction to traffic flow is serious for usually it is of comparatively long duration.

The proper application of loading zone provisions is comparatively simple. The need for loading zones is indicated wherever double line

parking takes place. Such places will usually be found on streets where there is shopping activity, commercial operations, or a prevalence of such structures as large office buildings, theatres, or hotels.

Loading zones are generally applied to the entrances of important structures of the character indicated. They should be used freely in other places where general need is present even though individual establishments are not of such a character as to set up a special requirement.

Aside from prohibited parking there is probably no single parking regulation of greater immediate benefit to traffic flow. Operating companies will find that commercial operators, property owners, and the general public will support any reasonable plan for establishing a system of loading zones. In summary, the loading zone regulation obtains maximum results with a minimum of disturbance. It illustrates to a very high degree the common interest, which all parties have in reasonable regulation.

An additional indication of the utility of the loading zone regulation is found in its inclusion in the Uniform Traffic Ordinance sponsored by the United State Department of Commerce. This document indicates the legal provisions which have been found most satisfactory and gives in detail the places to which the regulation should normally apply.

Prohibited Stoppings: There are certain places in every street system where the character of the traffic or the physical condition of the streets renders it necessary that traffic should keep in constant movement if a complete blocking of movement is to be avoided. Such places are fortunately limited in number, but where they exist, the necessary protection should be afforded by legislation and enforcement. A typical instance of a no-stopping area is the roadway between a street car safety zone and the adjacent curbing. The safety zone is a restriction in the roadway, and if the full capacity of the street is to be retained, it is necessary that vehicles operate as closely as possible to the curb. In fact, the application of the no stopping regulation to curbing near an intersection is desirable even though no safety zone is present to restrict the roadway width. Proper visibility around corners, a reasonable view of pedestrian traffic and of control devices, and the necessity to use approaches to intersections to the full capacity, combine to support the reasonableness of the rule.

Where sensibly applied, this regulation is one which is of mutual benefit to street car operators and to the drivers of vehicles.

Peak Hour Prohibitions: Traffic conditions in the central district or along particular arteries of travel may not be sufficiently severe under general conditions to warrant the prohibition of parking. Yet these same places may be so crowded during the peak hours of the morning and afternoon rush, that all traffic movement is badly delayed. Under such circumstances a prohibition of parking during the entire business day would not be justified to meet the limited time requirements of the rush hour. Such a situation indicates the use of a parking prohibition during the rush hours, and the permission of parking during the other

hours. The studies of a street car and vehicular obstructions outlined herein, should reveal the periods to which the restriction should apply.

The regulation is often of considerable value to business men located in the district or on the street affected. Where the morning prohibition extends until after the time for the normal opening of business, and where the afternoon prohibition begins before the normal close of business, unprofitable all day parking of vehicles by employees is discouraged, and the available space is rendered available for customers who arrive during the business hours of the day.

A modification of the peak hour prohibition, is its application to the inbound side of an important artery during the morning rush, and its application to the outbound side during the afternoon rush. This should be attempted only where traffic flow is definitely unbalanced.

Bus Stops: Where public carrier buses are permitted to operate, their loading requirements should be protected in such a manner as to facilitate their movements, and to protect other traffic from unnecessary interferences. This normally requires the establishment of curb loading zones similar to those previously described, but reserved by law for the special purpose of bus loading. A bus which is forced to load in double line cannot give safe or efficient service to its patrons. It is needless to say that the obstruction to traffic movement is similar to other types of double line parking.

Taxicab Stands: The character of taxicab business is such that a very substantial percentage of the patrons must be obtained from congested traffic districts. This business may originate either through the cab roving to seek its patron, or through the establishment of cab stands at convenient locations to which the patrons may go or from which the cab may be called. Roving or "cruising" is a practice which is widely and properly condemned as an improper cause of congestion. It results in much unnecessary and wasteful cab mileage on the streets, and in addition, cruising is normally at a comparatively low speed which impedes all other traffic movement.

Regulations against "cruising" are notoriously difficult to enforce. It is believed that the most certain cure for this difficulty is to be found in a system of properly located cab stands. This renders the cabs readily available for patrons, and suits the desires of the operator who then finds it possible to eliminate much of his dead mileage.

With increased congestion necessitating more stringent regulations against non-travel uses of the streets, it is inevitable that cab stands will be eliminated from the curbs, and will be located in off-street localities. This tendency is already marked in a number of cities and it is not improbable that the cab companies which are now able to obtain and control such positions will find strong competitive advantages in the future.

ENFORCEMENT OF PARKING REGULATIONS

A fair and firm enforcement of parking regulations has generally been considered an almost impossible task in most cities. This is due

primarily to the fact that parking rules have been considered unimportant or unfair by that portion of public opinion which has influence upon the enforcing agencies. Various punitive mechanisms, such as the traffic fines bureau, have been of assistance, but rarely of lasting value unless the regulations are strongly supported by public opinion.

This condition emphasizes the necessity to guarantee that each parking regulation is based upon reason as revealed by carefully collected facts. When such facts are made known to all parties affected, and their common interest revealed, a much more healthy enforcement condition is the normal result. Most police departments are able and willing to enforce parking rules if they receive encouragement, but few of them are able to withstand negative pressure from powerful business organizations, or influential individuals.

THE ULTIMATE SOLUTION OF THE PARKING PROBLEM

Curb parking will eventually be prohibited in the central business districts of all of the more crowded cities. This is rendered inevitable, first, because every available foot of roadway space will be required for traffic movement, and in the second place, because the capacity of the curbs for storage is so limited in relation to the demand that its continued use for such purpose will render no important public service.

There are probably not more than a comparatively few cities where general central-district prohibition would be justifiable today, though practically all have individual streets or sections where the regulation is warranted. The inevitable tendency should be apparent in all communities, however, and adjustments should be made to accommodate the change when it becomes imperative.

The natural alternative to curb parking is off street storage. Each year has shown an acceleration in the provision of garage space, and a recognition of the fact that garage structures properly designed, located, and operated, may be profitable business ventures. This gradual shift from curb to garage parking will serve as a material stimulus to automobile travel through the assurance of convenient terminals in the central district. The immediate effect of a parking prohibition may be helpful in facilitating movement of all vehicles.

SIGNALS AND TRAFFIC CONTROL

The Committee believes that the statements contained in the introductory paragraphs of the discussion on signals and traffic control on page 19 of the Transportation and Traffic Association Proceedings for 1929 in the report on *The Movement of the Vehicle*, are not only as true now as they were when written, but that for the sake of emphasis they should be repeated as a part of this report. They follow:

"STREET SPACE MUST BE EFFECTIVELY USED

"The need for continuous movement, at an adequate average speed, between points of origin and destination through streets

limited in traffic capacity is universal and urgent. Traffic control must aim at reduction in delays, elimination of confusion, facility of movement, and reduction in accidents. High-average speeds need not mean higher maximum speeds but should result from reduction in delays. As the volume of traffic increases, the simple rule of the greatest good to the greatest number, must be the guiding factor in solving the various problems that arise.

"A JOB FOR THE SPECIALIST"

"Traffic signals have been the subject of much discussion and of too much experimentation without engineering analysis on which to base installations. Most signals are much less effective than they might be. The only procedure that can most nearly insure success in developing control methods or devising signal installations should be based on correct analysis of the individual problems by competent engineers. Solutions are not standardized but the principles on which solutions are based have been carefully worked out and marked improvement can be obtained through the application of these principles to local needs by experienced and competent engineers. Neither signals nor control methods, however, can prevent limitations which are due to the physical incapacity of narrow streets to accommodate unlimited volumes of traffic. It is only possible to devise means that will produce the maximum possible effectiveness for the given physical conditions encountered. Such accomplishment is the purpose to be served. Seldom indeed is it even approached at present.

"THE BEST IS THE CHEAPEST"

"The cost of installation and of maintenance of the best signal system is very slightly more than that of the cheapest system. The accomplishment can be enormously enhanced. Considering the great value of the time of the people using city streets, it seems foolish to be concerned over the cost of a system which is capable of reducing delay and wastage of time and which will return each year many times the first cost."

The growing number of agencies which have either issued reports or are now studying means for expediting and controlling traffic movement constitute unmistakable evidence of the seriousness of the problem and of the determined purpose with which the country generally is beginning to address itself to the task of overcoming traffic difficulties. Typical of the many institutions of this character are the following:

- (1) National Conference on Street and Highway Safety.
- (2) National Safety Council.
- (3) American Road Builders Association—Committee on Traffic.
- (4) Highway Research Board of National Research Council.
- (5) Committee on Street Traffic Economics of A.E.R.A.
- (6) National Highway Traffic Association—Committee on Signals.
- (7) Albert Russel Erskine Bureau for Street Traffic Research, Harvard University.
- (8) Metropolitan Life Insurance Company.

There has been some tangible progress since the report on *The Movement of the Vehicle* was submitted in 1929, but it has been small.

Perhaps the most encouraging feature is that the possibility of achieving improvement is being realized in an increasing number of localities. In those cities where cooperation between the public authorities and the transportation agencies has existed to a large degree, the progress has been more encouraging. Those street railway companies that have employed the best talent available for the study of traffic conditions in addition to their own, have been wise. Where companies are not large enough to employ highly skilled men for such a purpose, it would undoubtedly be advantageous to retain the services of engineers on a part time basis so that continuous study of traffic problems can be made. Railway companies and city bus operating organizations could possibly, with benefit to themselves and the community served, set up or designate a traffic department headed by a traffic manager or engineer reporting to the president or general manager of the company and cooperating with the transportation department. It should be the function of this department to study the local traffic situation thoroughly, cooperating with city officials, the city traffic department, Chamber of Commerce, improvement associations, etc.

While the Committee feels that it should recommend that money be spent for signals for traffic control only as a result of the best engineering advice available, certain general information will undoubtedly be useful for preliminary work.

To conserve space and prevent unavoidable repetition, reference is made to the paragraphs on Through Streets and Boulevard Signs, Isolated Signal Lights, and Coordinated Signals, beginning with paragraph 12 of the 1929 report on *The Movement of the Vehicle*. It will be noted that reference is frequently made to the report of the American Electric Railway Association Committee on Street Traffic Economics with regard to signal lights.

An important development of the automatic signal is the so-called demand signal which is operated by the pressure of wheels or by the magnetic effect of approaching vehicles or in some cases by the interruption of a light beam. By accumulating such impulses the signal will operate to clear the street for the heaviest traffic. Such signals are installed in Baltimore, Boston, Philadelphia, Wilmington, and various other places. They have been installed with success at intersections involving more than the regulation two streets but have not yet been adapted for use in conjunction with the flexible progressive system, although it is considered possible to make such adaptation.

A definite trend toward the use of full, flexible, progressive systems of light signals seems apparent, but installation progresses slowly because of what may be over cautiousness on the part of public authorities. Studies in Washington indicate that installation of the full flexible progressive system should increase speed of traffic on main streets 20 to 38 per cent and in some cases should increase street capacity by more than 100 per cent. This is equivalent to doubling the width of the street. On Michigan Boulevard in Chicago for three miles adjacent

to the main business section, the average speed of traffic is ten miles per hour but drops at the rush hour to four miles per hour. By the installation of flexible progressive control the capacity of the thoroughfare and speed of movement will be increased substantially.

THE ACCIDENT HAZARD

Speed under proper regulation need not mean increased accidents. Emphasis may well be placed, however, upon the vital necessity of the proper regulation of traffic if increased speed is to be maintained with safety. The following quotation from an article by Dr. Miller McClintock, Director, Erskine Bureau for Traffic Research, Harvard University, sets forth the present day attitude toward speed:

"Each successive year shows substantial gains in mechanical perfection and operating comfort. To a considerable degree, this progress can be summarized by saying that the products of the automobile industry for each successive year show a capacity for greater sustained speeds with equal or greater carrying capacity, comfort, safety, and economy.

"Few conditions could be more paradoxical than that of streets and highways filled with automotive vehicles with speed potentials of fifty miles an hour or more forced to operate at the speed of horse-drawn vehicles because of the inadequacy of highway design and traffic control."

It is obvious that signal lights and other means of traffic control do reduce accident hazard. There have been some concrete indications as to degree. Measures on a broad scale, however, have not been developed as yet and made generally available. It has been stated that "it appears that for traffic through intersections exceeding 10,000 vehicles in ten hours, the accident hazard can be decreased 35 per cent by installation of automatic electric traffic signals with adequate visibility, while below 10,000 vehicles per day the saving decreases and below about 7,000 vehicles per day, signals would be of doubtful benefit in preventing accidents."—*American City Magazine*, May, 1929—H. S. Simpson.

There is a tendency on the part of pedestrians to violate the light regulations in proportion to the length of the red signal. One study based on extensive observations indicates that with a 50-second red interval some 20 per cent of the pedestrians will violate the light, whereas with a 100-second red interval, 55 per cent will violate the signal. It is recognized, however, that due to local conditions, width of street, etc., special study must be given each case.

In a report concerning through streets protected by stop signs by the National Safety Council, Chicago, the conclusion is reached that collisions at intersections are materially reduced by establishment of through streets.

One of the contributing causes in many accidents is the solid line of vehicles parked along the curb. Pedestrians, particularly children, may dart between parked cars unable to see on-coming traffic, so that the approaching motorist or street car operator may be unable to avoid an accident even though using reasonable care.

EFFECT OF LOADING ZONES OR SAFETY ISLANDS

Loading zones protect the street car passengers and pedestrians and at the same time allow vehicles to move past loading points. They help materially to expedite the movement of all vehicles and so make faster schedules possible. Proper use of loading zones and safety islands may provide ample protection to pedestrians in many cases and either postpone installation of traffic lights or where flexible progressive light systems are installed, may allow a more favorable timing of such signals:—as, for instance, at pedestrian crossings when it is not convenient to interrupt vehicle traffic both directions at the same time. In such cases it may be possible to preserve the progressive movement of vehicles by allowing pedestrians to cross half the street at one time, pausing a few seconds on a safety island in the center of the street while waiting for vehicle traffic on the other half of the street to be stopped by the signal.

An interesting experiment in the protection of pedestrians while at the same time allowing vehicular traffic to keep moving is being made in Germany where in some large cities isles of safety are provided "in such locations that a pedestrian crossing can sift through the traffic without stopping it and without the direction of an officer." The method is to leave room for only one lane of traffic between the islands, thus requiring the pedestrian to watch only one lane at a time and causing the motorist to operate past the island at a moderate rate of speed because of the somewhat narrow path between the islands. The use of such islands is particularly advantageous at complicated locations where, by their use the pedestrians can go almost at will in various directions without there being any need to halt vehicular traffic. (State of Connecticut, Department of Motor Vehicles, Bulletin No. 70.)

SHORT LOOPS

The opinion of the Committee is that the street railway should not withdraw from congested districts on account of traffic congestion. On the contrary, the more congested the district, the more important the street car becomes in rendering transportation service to those persons desiring to transact business in such areas. The railway must make its own operation as nearly perfect as possible and should give every assistance to civic authorities to help them analyze and improve traffic conditions. Congestion must not be allowed to impair the utility of such districts. Rather, easy traffic flow is essential to expansion of business activities.

The routing of lines—through routing and looping—must be carefully considered. Unnecessary turning movements are to be avoided wherever possible. Lines that must loop in active business centers should go around in a clockwise direction, one left and three right turns rather than counter clockwise which requires one right and three left turns. Chicago can be cited as an example of what can be done in this respect. On one of the routes, cars consumed 57 minutes to loop within the

central district during the Christmas season and after the rerouting of all lines this time was reduced to 19 minutes.

It sometimes happens that the point of maximum loading on some lines that come into districts of heavy traffic density is at a point outside on account of the location of industrial plants. In the evening peak period it is unnecessary to send all cars into the congested district since they are not needed until the controlling point is reached. Some cars can well be short looped between this point and the congested area and in addition they should be placed on runs that do not pull in and complete their day's work after the evening peak trip has been completed. During the morning peak period all cars should be sent into the area even if the controlling point is outside the district.

In rerouting and short looping of lines, the convenience of the service to the public is paramount. The public transportation vehicle can offer a convenience in busy districts to a degree that private automobiles can not easily attain and it is unwise to discount this desirable feature of the service.

EQUIPMENT

Equipment as a factor in the movement of the vehicle was treated as a sub-division of the 1929 report on Movement of the Vehicle (page 29, 1929 T. and T. Proc.). It will be noted that frequent references are made therein to the report of the Committee on Service Betterment of the Transportation and Traffic Association, submitted in 1928. It is therefore obvious that the consideration of equipment by your Committee this year can be but a continuation of these studies. The principal development during the present year has been that transportation companies and equipment manufacturers have both turned their attention more energetically toward the improvement of old equipment to enable it to measure up more nearly to the requirements which present competition places upon it. No effort is made to detract from the value of recommendations of previous reports with regard to new equipment. Since, however, recommendations regarding new equipment are being developed by a Committee on The Equipment and since one outstanding problem that faces urban transportation companies is that of quickly improving rolling stock which has been in service for some time the study of your Committee has been limited to that phase of the subject. Of course, ideal cars are new cars, but there is such a wide difference between the cost of new and remodeled old equipment that the latter offers a fertile field for study and improvement.

The cooperative efforts of transportation companies and equipment manufacturers who have been working on changes in old equipment with the object of bringing its performance as near as possible up to the present recognized standards, have progressed to the point where the Committee feels it can draw some definite conclusions and offer recommendations. It is, however, an outstanding and well recognized fact

that heretofore there has been little attempt at standardization in car design and car equipment, with the result that each operating company has its own characteristic equipment. Details with regard to existing equipment and operating conditions vary so much that it is possible to make only general recommendations and to point to possibilities for improvement that lie broadly in the field, leaving the details to be worked out on each property.

Manufacturers are in a position to give excellent assistance in the effort to apply the most recent developments to the particular types of equipment found in operation.

The principal features of existing equipment which are most readily susceptible of improvement are:

(1) The time lost at regular stopping places may be substantially reduced by relocating and rearranging platforms so as to save lost motion on the part of the operator. This includes changing design of steps, doors, stanchions, location of fare box, operating levers, change-making and transfer storage devices and arrangement of doors for most convenient operation and to secure the best circulation of the passenger load.

(2) A substantial saving of accelerating time may be effected in certain types of old equipment by—

(a)—Rewinding old motors to secure higher accelerating characteristics. As much as 37 per cent increase in accelerating rate and up to 2.6 miles per hour per second has been attained by rewinding old motors.

(b) Improvement can be made in control and motor equipment by adding steps on controller and, in some cases, by providing field tappers or field shunts.

(c) Improved accelerating and speed characteristics have been obtained in old two-motor cars with maximum traction trucks by converting to four-motor equipment, by gearing 25 h. p. motors to the present idler axles.

(d) Trolley voltage may be increased either by supplying additional feeder capacity or additional substations. Low trolley voltage may result in poor operating characteristics, especially in rush hours.

(3) A saving in decelerating time may also be effected by changes in existing braking equipment. The distance required to bring cars to a stop has, in some cases, been cut 50 per cent. The devices which may be used in improving deceleration are:

(a) Relay valves in braking system.

(b) Increased size of ports in brake valves.

(c) Increasing air pressure on system.

(d) Pressure regulators in braking system to overcome variation in governor pressures.

(e) A new form of self-lapping air valve.

The manufacturers are now, and will continue to be in possession of the most recent developments. The following specific instances are examples of what is being done in the effort to speed up old rolling stock:

The Pittsburgh Railways Company has recently rewound Westinghouse 514-40 h.p. motors with 2-turn armature coils instead of

the standard 3-turn coils. Balancing speeds have been increased 33 per cent and schedule speeds will be improved in proportion.

The Philadelphia Rapid Transit Company has equipped 300 Westinghouse Type 305-CA—65 h.p. motors with external fans, which has increased the continuous rating of this non-ventilated motor approximately 50 per cent. This improvement permitted the operation of these motors in Philadelphia service with decreased maintenance expense.

The shunting of the fields of old motors is one of the simplest and least expensive means of increasing schedule speeds. The United Railways and Electric Company of Baltimore, after several years testing, is equipping over 100 cars with shunting apparatus. A shunting equipment consists of contractors, limit switch, and resistor shunts for fields.

In reconstructing fifty, old, center-entrance cars for one-man service in Milwaukee, the company successfully converted these cars from two-motor to adequate four-motor units by gearing a 25 h.p. motor to each of the idle axles on the old maximum traction trucks.

To obtain improved braking, hundreds of relay valves have been installed on both new and old equipment, by many companies.

Careful analysis of costs and probable results is desirable before modifying old rolling stock for higher-speed operation. Complete data should be referred to the electrical equipment manufacturer of the apparatus for engineering approval and recommendation on each case. In general, with old equipment speeded up, somewhat higher power consumption and maintenance costs may be expected.

IMPROVEMENT IN EQUIPMENT OPERATION

It is neither good business nor good practice to spend money for the purpose of improving the operating qualities of old equipment unless equal effort is made to improve methods of using it by the operating personnel. Schedules can be improved and unsound methods of car-handling can be eliminated. It has been established beyond question that there is a fertile field for study and improvement in the making of schedules, and in the study and improvement of car-handling by trainmen. Much has also been accomplished by study and improvement in the methods of instruction. Chicago, Baltimore, Cleveland, St. Louis, Pittsburgh, Providence, Boston, Eastern Massachusetts, are among the many properties that have amply demonstrated these facts. Schedules and operating actions of trainmen which have not been studied for the purpose of refinement offer opportunities similar to machine work which has not been modernized by elimination of waste motion and other unsound practices.

Your Committee is convinced that important results have been secured in speeding up, improving deceleration, and otherwise making old equipment more nearly able to meet competitive demands, and that all companies should exhaust their possibilities in this direction, without delay. Unless, however, equal energy is expended in schedule improvement.

study of individual operating practice, together with study and improvement of instruction methods, a great deal of the value of any equipment improvement will be wasted.

Respectfully submitted,

JAS. L. ADAMS,
O. A. BROTEN,
C. H. CHAPMAN,
M. W. COOKE,
J. F. CRAIG,
H. H. DART,
DONALD GOODRICH,
A. J. FINK,
H. H. HILE,
DEAN J. LOCKE,
DR. MILLER MCCLINTOCK,
E. D. MERRILL,
JOHN METCALF,
JOHN B. O'CONNELL,
E. A. PALMER,
R. H. PINKLEY,
J. B. STEWART, JR.
J. C. THIRDWALL,
W. E. THOMPSON,
C. W. WILSON, *Chairman*
D. L. FENNELL, *Sponsor*,
PAUL E. WILSON, *Sponsor*.

Committee on The Movement of the Vehicle.

[Mr. McIlraith's presentation of the report including his discussion of it is as follows:]

E. J. MCILRAITH:—I shall endeavor to follow the contents of the report and then give some few comments that may be a little contrary to what is here expressed.

Table 1 of the report is a typical illustration of the type of statistics that have been used against this industry a great deal and, while of value, I think we must remember that in all classes of reports the use of such a table often is made purposely misleading. Here it is not, it is true, but in traffic surveys we have much alarmist comment centering around a tabulation such as on page 29, which shows the enormous growth in the number of automobiles registered and seems to threaten the railways and all other forms of transportation with immediate extinction. Such will not be the case.

It is, in passing, interesting to note the change in the rate of growth and that the growth today is quite low, being around five per cent. Of course, in the year 1930 the rate of growth is negligible because of the industrial conditions, but five to six per cent was the rate of growth in 1927 and 1928.

Fig. 1 shows a more reassuring tabulation in graphical form on semi-logarithmic paper which indicates a tendency towards saturation in the extension or in the increase in number of automobiles. It is, of course, well known to all of us from the records that we are getting closer and closer to that period when the increase in the purchase of automobiles will be very small and only replacement business and obsolescence will produce the automobile manufacturers' prosperity.

It is most important to realize that this industry has gone through the most extensive period of readjustment to the habits of the citizens of the country that has taken place in a very, very long period of years and if it has survived so successfully as it has, we need not be concerned about the possibilities of getting increased business within a relatively short period of years.

In Table 2 giving comparisons of the riding habit in various cities, you will find some rather interesting information. In glancing through it, we find a very radical departure between the relative size of cities and the riding habit per unit of population within those cities. For example, in New York a city having a population of over 6 million, they show 485 rides per year per capita. Chicago, with 376 rides per capita, has about half the population of New York. And then comes Boston, with a population of 1,220,000 and they must have here used six or seven different communities adjacent to Boston to bring its population to that size. But in tabulating the population and the riding habit, that addition should be made due to the fact that communities immediately adjacent to Boston, like Summerville and Cambridge, are a part of the community although not a part of the city government of Boston. In Boston the riding habit is 301, while in Pittsburgh, listed here with the same population, which again must take in the metropolitan area served by the Pittsburgh Railways because I believe they serve more than 30 communities, they have 205 rides per capita.

There is a radical difference, 301 in Boston and 205 in Pittsburgh. Then there is a city in between, Cleveland, with a population listed at 1,100,000, with 236 rides per capita. While in a small city, like Richmond, with 192,000 population there are 221 rides per capita. It seems odd that this variation should exist.

These differences are not necessarily due to the population alone. There are peculiar and different contributing conditions that create these distinctions and the condition here in San Francisco, where the rides per capita are 461, well illustrates the point. Much of the riding in San Francisco is necessarily the riding of those people who live across the Bay and who are not counted in the population of the city of San Francisco, but who transact their business, to a large extent, within the city. The conditions here, then, are quite different from what they would be in a city such as Boston. But Boston, on the other hand, has a condition quite different from Pittsburgh; Pittsburgh is a city of hills and ridges and deep valleys, and steep side slopes on the hills. There is some little up and down communication on the slopes and people adjacent to the railway lines may readily use them. But it is often difficult to coax people to walk four blocks up a hill to the transportation line in order to get to town. It is very much easier for them to ride in their own vehicles. The topography of Pittsburgh is probably more controlling than in any other city that we know, in cutting down the number of rides per capita, because they have no cable lines, as in San Francisco. A low riding habit can be expected in such a community. Those factors help to explain many of the variations that exist in different cities and which are quite striking as you analyze the table.

The committee points out very properly that the great factor in determining the use of public conveniences or public carriers, is the character of service rendered; and the character of service rendered is not always, in our line of business, such as to justify the high degree of public support. It is our job to make it better, but we all know the faults in our own properties which are sufficiently harmful to disturb seriously the public patronage that we are getting.

I was very much impressed by the article prepared for *Electric Traction* in the convention number, by Samuel Riddle, of the Louisville Railway Company. It was a very excellent statement of the case in analyzing what should be the quality of service given to the public. He stated it in a very readable style and hit upon some excellent factors that influence people very seriously in riding on the cars that we provide for them. I was very much impressed with one feature that is not so often stressed, i. e., the decorative effect of the interior is not nearly so important as the decorative effect and pleasing appearance of the exterior. The outside of the car is the thing in which the citizens take personal pride, and it is the thing that attracts them or makes them think of a cheap company, or one that is unable to pay its bills. This has been emphasized so many times, and in so many cities, that we should not forget it. Yet there are still some cities where the cars look faded and worn and as though the paint had all been washed away long since and where a little paint would give a new lease of life to the railway.

In this connection I can remember one very striking example. During the war, in Seattle, we had many cars that were getting a little seedy in appearance and the trainmen were beginning to turn them in too often, for one fault or another, so they could get a better looking car, which they thought would be a better car. The management decided to play a little trick so they put the cars through the shop as rapidly as possible, painted them one coat outside, painted the interior and the floors, varnished the trimming, and for a few dollars per car, made the cars look renovated. They went out without any work being done on them in a mechanical way and those cars, repeatedly turned in previously for mechanical defects, imaginary or actual, were kept on the road with as much interest from the trainmen, and were retained just as regularly in operation as the finest and newest cars that were on the street. The men had a new pride in their jobs and they took pride in taking care of those newly painted cars. The cost was negligible and it certainly did the trick in getting more patronage, and more enthusiasm and interest from the trainmen who, after all, represent us either successfully or unsuccessfully.

It is unavoidable that we have the contrast between the tendencies shown in Fig. 4 and 5. The cities of smaller size (Fig. 4) have been showing, since 1914 or 1915, quite a downward tendency in the rides per capita due to this tremendous growth of automobiles and due to the willingness of the American public to spend a lot of money for luxury, but unwilling to spend a few cents for an avoidable necessity.

But Fig. 5 shows a tendency which is inescapable in the larger cities. There is no chance that even a major portion of the public can ride to and from the business centers of large cities in private automobiles and the riding habit is bound to increase in the larger cities. The curve shows Chicago's riding habit has not continued at its previous rate because the last few years have not been as progressive as if there had been the needed improvement in facilities. While the rides have been increasing the riding habit has not been increasing.

Next we come to a list of the competitive factors from the viewpoint of the potential user. In the list presented are the terms, "speed," "terminal convenience," "riding comfort," "selection of routing," and "cost." Under the various items is treated the subject of the relative mass of the classes of service available to the users of transportation.

There is no question but that the speed of the private vehicle seems vastly greater to the user, or to the man who is riding on the street car, than the speed of the street car. Each one of us driving an automobile thinks in terms of the occasional glance we get at the speedometer, rather than in terms of actual distance covered in a given time, or the actual average rate of speed from point of origin to destination. It is difficult to drive for a distance of 7 or 8 miles in a city as large as Chicago at an average speed of more than 15 miles an hour because of the frequency of traffic stops and slowdowns. More often it is less than 15 miles per hour. However, few drivers have any such conception of the rate at which they are moving. They get spurts down the block, or for a few blocks, and perhaps they are going at times 25, 30, 35, or even on the outer drive 50 miles an hour. To them the actual accomplishment for their automobile is high for it is the high speed periods

that impress. So the supposed speed in a private automobile is bound to be much greater than the actual speed attained.

The street car, with all of its stops, runs at a speed which is much higher than the public believes, because the inevitable stopping to load and unload creates in the mind of the passenger the effect of delay and he begins to feel impatient. If street cars were able to run continuously at a lower speed, without stopping, the public would be very much better satisfied with the ride.

Inasmuch as the average speed of an automobile may be 15 miles an hour or less, and the average speed of the street car in Chicago is 11.43 miles per hour, there isn't a great difference; and when you take into account the time lost in getting a storage space for the car, or walking to and from that storage space, it is not necessarily true that a 5 or 6 mile ride by automobile in a large city is any faster than by a street car.

The terminal convenience is the critical factor in determining, for many, whether or not they will use an automobile. Terminal facilities for automobiles in the central business district are necessarily limited, difficult to provide and, therefore, are going to be the biggest constructive influence preventing the majority of people from being able to use satisfactorily the private vehicle.

The riding comfort of street cars is, of course, something on which we are now all working with considerable interest, trying to provide quieter, smoother, faster, better rides in vehicles that give the impression of comfort. Riding comfort, I think, today is more linked up with the question of noise reduction than it is with any other single factor. Noise reduction has not been given adequate attention by the railroads although I do not think it has yet been given the prominence in the discussions that it ought to be given. We are in a very critical period for financing, for readjusting old equipment, but the one outstanding thing that seems to me to be most neglected, and yet most necessary, is getting the street car out of the nuisance class as a noise producer.

The selection of routing is, of course, the thing that often creates for the citizen the need for use of an automobile, and I dare say that practically every one in this room uses an auto-

mobile more because of his fancied freedom to select his route and to go and come when he wishes, than the actual necessity of having the car at all times.

We do not, any of us, ride street cars enough. If we did, we might be more alert to the little things we could do in making the street cars more efficient because we ourselves would then be more in the critical frame of mind of our patrons.

The question of cost is, of course, pertinent. The cost of running an automobile is high, but few people realize or are willing to count the cost, but they will and do count it when it comes to paying a street railway fare. It is strange psychology, but we all know there is no problem involved in getting people to use automobiles to a greater extent than they can afford; but when the fare changes from 7 cents to 8 cents, a change of that small amount reduces materially the number of riders on the cars. It is not that the matter of the cent is important, but it is the question of the psychology that the rate has gone up and they resent that change. The question of cost is one of psychology rather than of actual money pinching.

I am sure that the public would prefer to pay 10 cents for a quality ride, if we have one to offer, as evidenced in bus operations, instead of 7 cents for some less desirable type of operation. By that I do not mean to infer that all bus operation is superior to all street railway operation, or that even the average of bus operation is superior in service rendered to the average street railway operation. But the public impression is that riding in a bus is a little bit better than riding in a street car.

The experience of Mr. A. E. West in Salt Lake is quite interesting. He experienced a very rapid increase in the rate of riding on his trolley bus line, while other lines were showing consistent losses. That is another indication of the public response to something different. It was not because the trolley buses were good riding vehicles. The first units that were placed on the line were not at all smooth, easy riding or comfortable vehicles, because they had a rough street, the tires carried high pressure, the spring suspension was not so good, and it was more uncomfortable riding than a ride in a good street car on a reasonable track. But it was a new unit, there

was a little distinction to riding in such a unit, and the public responded with a jump. People are willing to pay more money for what seems a quality ride than to pay a little higher rate for the ride on a street car in order that the company may give the better quality of service. With improved cars and quality of service patronage may be brought back to the street railway as well.

Passing to the next section, the parking problem, the committee is setting up some general principles that seem appropriate in considering the question of parking control.

The committee has mentioned the success of prohibited parking in the Chicago Loop district and the more stringent regulations in a number of American cities, and emphasizes that this is developing a tendency to give more serious consideration to the advisability of parking control even in quite small communities. Cities of less than 100,000 are more seriously considering parking elimination in entire districts than before the one outstanding example of a long period of experience was available to them.

The general question of parking, as covered in this report, is not stressed quite so much as it might be, and I think this is undoubtedly the case because other committees of the Association have discussed the subject thoroughly. Last year, in a report of the committee on Street Traffic Economics, principles of parking control were set forth covering when it should be made effective, and methods of approach.

The report next goes to a discussion of the need for facts in the control of traffic and properly emphasizes, in some length, the very great need of finding out what it is all about before parking regulations go into effect.

However, I take issue with the statement made in the report that the parking rules in the Loop of Chicago are the "most extreme ever applied." For, if they were, they would never have prevailed. The "no parking area" covers a district which could logically be said to be in need of parking control before the regulation went into effect. That the owners of the property in the neighborhood, and the users of the street, had agreed upon it, is well indicated by the fact that 140 individual

ordinances had been passed, covering short sections, restricting parking before the time that this was introduced.

This regulation was first developed on the west coast, in Los Angeles, I believe, and where the application of it was thrown out within 24 hours, if I remember correctly, because it was too extreme. In Philadelphia, likewise, the police department entered a ruling that was much too extensive in view of the facts and took a very large area into the parking restrictions. The area, so drastically controlled, or intended to be so drastically controlled, was so large that there was too much opposition from varied interests and the thing was not enforced and died from its own sheer over-enthusiasm. Extreme applications of "no parking" ought never be attempted.

In Chicago, the area was selected with sufficient care so that there was not likely to be much opposition to the ordinance. I would like to add now the fact that the period from the time the city council asked the Chicago Surface Lines to prepare the ordinance—because we were doing traffic work for them in the city—until the ordinance was actually put through was approximately two years. We could have had the ordinance enacted by the council at the moment they asked that it be prepared. We proceeded to prepare the ordinance at the time and told them the citizens were not ready for it and that it should not be pressed before educational preparation had been carried on. It was only after complete support had been obtained, and the education of the council, the merchants and influential leaders of business who would be affected by it had been accomplished, that we were willing to have the ordinance go before the council to be passed.

The most important feature of all is that of education and mutual cooperation in the arrangement of these regulations, and not in getting something that is nicely written on the books. If it is not supported by the taxicab interests, the merchants, the bankers, the building owners and managers' association, the trucking interests, the bus companies, the automobile clubs, the lawyers and attorneys, or other individuals who feel they are important in the business life, then there is no use having it written—it cannot be supported and will not be carried through.

Going further, the report gets into a detailed description of certain types of parking studies that companies might carry on, and should carry on. I think many of these are very desirable types of studies, but need not all be carried on by any one company. Some of them might be made in a little simpler fashion than as listed in the report, if the purpose to be served is well known. Frequently, a short study will serve just as well as an extremely elaborate analysis. The smaller study may be justifiable and may produce the end just as successfully as a more intricate one. Most traffic analyses in cities have been too elaborate altogether. They produce a fine report of several hundred pages, charts and diagrams and statistics, much of which is reasonably informative, but is of no consequence in providing the needed answer. It is much more effective to spend a longer time, in a much simpler analysis, and doing something more educational rather than compiling a flock of statistics which become cold and, if not acted on quickly, of no value at a later time. The very extent of the check, of the series of checks, may defeat the purpose of getting quick consideration, or continual, recurring consideration, until the final education of the group is accomplished. It is often more desirable to be continually hammering with a lot of little data, and with a lot of continuous conferences, than to give them an avalanche at once, which gets little response, because it is not understood.

Under the heading of "The Effect of Parking on Vehicular Traffic Movement" we have an analysis of the time lost due to traffic delays in the central business district which has a great deal of interest to the operating group. I assume it represents time lost due to all types of delay. It shows the total delay time to be 38.8 per cent of the total operating time due to various causes. Necessarily we are looking at that 38.8 per cent with a good deal of critical interest. It represents the difference between a successful movement and one that is quite open to public condemnation. It is not to a railway's credit that it permits such a condition to prevail because it should be able to induce the public officials to make the necessary changes and adjustments to get the traffic movement speeded up. The railway can do much in its own way towards

speeding up the traffic along the street, but there must be some way of accomplishing an education of the civic group to eliminate these excessive delays that we have due to faulty traffic control and due to the use of police officers not trained, or becoming careless, or some other form of traffic control which is not modernized or competent.

Special parking restrictions are necessary in all communities and, indeed, special parking restrictions may often cure a serious bottle-neck condition without requiring more than just a minor change in the parking regulations.

It is inevitable that we must have parking control in the vicinity of loading zones, or safety zones, whichever you wish to call them; that there shall be zones in which stops are prohibited because it is impossible to get a reasonable flow of traffic along a street where taxicabs or buses make stops at cross walks, opposite safety zones, in front of street cars, or in intersections when they are picking up and discharging passengers. The stopping of private vehicles and taxicabs within such areas should be subject to strict regulation.

The peak hour parking restriction is a necessity to prevent clogged streets. Parking control, from 4:30 to 6:30, along one side of the street often brings a very marked improvement in the traffic conditions along that route, and sometimes along some of the adjacent routes as well, because it changes the amount of traffic on the various streets or the distribution of the traffic.

The use of taxicab stands is here listed as one of the topics for special consideration and I note this sentence: "Roving or cruising is a practice which is widely and properly condemned as an improper cause of congestion." It comes under the heading of "taxicab stands," and there is an inference here that perhaps taxicab stands are preferable to "roving or cruising." That is true if the taxicab stand is over on a side street where it doesn't interfere with the movement of traffic, but a taxicab stand on a busy street is worse than roving or cruising. If you will look at the report of the committee on Street Traffic Economics for this year you will find some good statistics to show the actual use made of the curb lane, when used by taxicab stands in the block, compared with the use of that curb

lane when there is heavy cruising, that runs as high as 40 per cent of the vehicles along a street and on streets where there is neither excessive cruising or taxicab stands. I would prefer to see any street used by cruising taxicabs and chauffeur driven vehicles, than to see a taxicab stand installed on that busy street. It would give more freedom of movement except, of course, on the street where there may be parking of private vehicles and the parking of private vehicles cannot otherwise be eliminated, part of the space can very well be used for taxicab stands without any more inconvenience to the users of the street than would prevail there with the private parking.

The enforcement of parking regulations, as listed here, is necessarily a very difficult thing. Naturally, where there is complete prohibition of parking and the curbs are painted or marked, and signs are up, it is not at all difficult to spot the violator but where the time violation is the measure for the traffic officer it is nearly impossible for him to keep the violators within control.

I think that "the provision of garage space, and a recognition of the fact that garage structures properly designed, located and operated, may be profitable business ventures" would be a stimulus to the use of those automobiles which are important in a man's daily business, but it will not be a stimulus in the use of automobiles by the casual rider who merely comes in for sight-seeing purposes or who comes in hoping to do five or ten minutes' business and then go on. The person who merely drives to the down town section and parks at the curb, for the purpose of going to lunch, or for a short visit, wouldn't be inclined to spend 75 cents, or thereabouts, for a garage. It seems odd that people are willing to spend two or three dollars to drive their cars to a particular destination and then are so unwilling to spend 75 cents to insure cleanliness and careful care while the car is not in use. But nevertheless, it is a fact that people will pay considerable to drive an automobile for their own personal convenience or for a sense of luxury and yet hazard an expensive automobile at the curb without protection when it might be safely put away in a garage and not be subject to having a fender ripped off, or some expensive paint work damaged.

Under the heading of "signals and traffic control," the committee first emphasizes the points that have been stressed in previous years' reports. One is that the signal control should be placed in operation only after very careful engineering analysis of the job. This point cannot be too highly stressed. We are blessed with traffic signals all over this country today that are making more of a nuisance of themselves than they should.

It is clearly brought out in this report, and in the report of the committee on Street Traffic Economics that some times less than 50 per cent of the capacity of a street is available under existing control methods and that the speed of the vehicle is being cut down exceedingly by improper signal application. The designing of signals to suit the actual needs of a street is a technical problem and one of importance. Perhaps not many railway men have taken the time to become well informed on traffic control by signals, but it is not at all difficult to develop for any street a type of signal control which will be superior to the operation of the street running freely without control, or to the control of that street by any form of police manipulation that might be developed. A single intersection can be better handled under any condition where the traffic volume is great enough to justify the use of signals, by a properly controlled signal than by an officer be he ever so efficient, or by any means that I know available to us. It is not at all difficult to show, in the most complex intersections, that signal control automatically operated, is vastly superior to the judgment of a traffic officer.

It is also to be emphasized here that in putting in signals it is a very serious mistake to save money on the installation cost. There is no economy in saving 150 dollars per intersection on an installation that may cost from 1,000 to 3,000 dollars, depending on the conditions, and getting a second rate signal system, when the best available could be obtained for a little extra money. I have reference to the best in the controlling unit. The shape, size and style of the post used do not matter; only the control itself and the flexibility of that control are important.

The reports adopted this year at the National Conference on Street and Highway Safety, in Washington, have many good recommendations as to the location of signals, the type

of signals, the type of control, the fitting of the control to the actual street involved, and should be used, as referred to in this report, as good supplementary information in thinking about signals and what should be used.

Again the accident hazard is mentioned. The accident hazard is one of the factors that should be considered under the question of speed of the street railway line. I think we have paid too much attention to the probable accident hazard in considering street car speed. It is not necessarily a fact that increased speed, average speed of operation, creates an increased accident hazard. It is quite possible to increase the speed very materially and still reduce the hazard upon the street, but I am very much surprised, in some cities, to find that the street car goes along the street with an apology for its presence at every street corner. The motorman is expected to stop and hesitate and look around and say to everybody else, "As soon as you are through I will go along." We are not in that kind of business. We are taking considerable pride in the fact that our business is a public necessity and that we belong on the streets in giving a good and satisfactory service. At the same time we are letting the accident departments emphasize certain features unnecessarily when the real answer is in training the men to use proper judgment, not training them to reduce speed. Recklessness and speed are not one and the same thing. It is possible to be reckless without being fast, and it is possible to be fast without being reckless. There are not enough properties that have educated their accident departments to this distinction between recklessness and speed. We should control recklessness; we need not reduce speed; we should use appropriately the available speed that our units will give to us.

It is quite naturally true, as we have all learned, that the use of loading zones, or safety islands, will improve the flow characteristics of all types of traffic along a given street. It not only increases the speed and convenience of these street railway units, but it increases the speed and convenience available to the automobile and, therefore, is a general public improvement well justifying the cost of the safety island. It is a great factor in increasing the safety for pedestrians crossing the street as well as for street railway passengers.

The last section is a section covering the equipment and in that section the summary, I think, is the most important part of it.

The various changes recommended would be justifiable on many types of equipment. All of them are in use in some property; many of them on many properties. The illustrations shown here as to where some of these particular changes have been made are appropriate and give support to the actual recommendations.

The final paragraph or two sums up the report by saying that all of these are very good, but much yet remains to be done in checking up operating practices; and that while all of the operating practices, all of these methods of changing equipment and installing new street control, and all of that, will produce results, the committee states, "Unless, however, equal energy is expended in schedule improvement, study of individual operating practice, together with study and improvement of instruction methods, a great deal of the value of any equipment improvement will be wasted."

I would like to emphasize here, that in my opinion, it is operating practices upon the street and schedule practices within the company's planning organization that can control speed most effectively. We are weak, in this country, on correct analysis of what cars can do upon the street, then scheduling them so that they will do it, and following them up on the street and encouraging the men to do that which is scheduled. Schedules have not been given the attention deserved. The analysis for schedules is not as competent as it ought to be. The pressure from the management to get detailed follow-up of operating principles, good operating principles, should be much more intensive than ordinarily given. The committee properly emphasizes those features at the close.

CHAIRMAN WILSON:—Mr. A. J. Lundberg will discuss the report for us.

A. J. LUNDBERG:—In discussing this report I think I should point out that I do it with the eyes of a layman, for I am not an engineer and have had but little operating experience. I think, however, that the layman's view may be valuable.

One cannot read this admirable report, nor the reports that have issued from the recent traffic conference at Washington, without realizing the mass of factual information which can be brought to bear on traffic problems and I am convinced that it is the duty of us street railway companies, in those cities where traffic problems are not solved on the basis of factual information, to try and see what we can do to bring that about.

I know that there are very many places where traffic problems aren't solved on the basis of facts. It can easily be seen, from these reports, that there are many facts already available and that there are well defined means by which the facts can be developed. We ought to try and see that these problems are decided on the facts because the traffic problem is certainly one of the most serious matters that confronts us today. I think it is, to a large extent, the key to the future of our own industry.

In reading this report there are two matters that I would like to bring to your attention, not in the way of criticism, because it is an admirable report, but because they strike me, as a layman, as being interesting thoughts. In the conclusion of the section of the report, entitled "Competitive Factors from the Viewpoint of the Potential User," it is stated: "It is too early in the development of the automobile, and facts are too inadequate to draw definite conclusions with respect to the ultimate competitive effects of the private automobile on collective transportation."

Personally, I do not think it is too early. I believe that the private automobile has already advanced to the point where we can safely draw certain conclusions from it for the future. I think, for instance, that we can safely resolve now that our American cities divide themselves into three classes: cities of one million population or over; cities of perhaps two hundred thousand to one million; and cities of less than two hundred thousand. I think the very physical limitation of our streets indicates that in cities of one million or over we are going to have subways, elevated, and other means of off grade transportation. The same conditions apply in the cities of two hundred thousand to one million, but obviously the financial situation is such that those cities are going to continue with surface trans-

portation, and it is going to be our job to see that the conditions are made such that they can get along comfortably for the citizens and with success to ourselves.

I think we may also draw the conclusion, from actual experience so far in this country, that in cities of less than two hundred thousand it is a very serious question what the future has in store. Here in California we have had a considerable number of abandonments in our smaller cities and it may be that we have not yet reached the answer for mass transportation in cities of that size. Perhaps it needs some new type of unit that has not as yet been developed.

But since most of us are serving cities in the first two groups, it seems to me that we can definitely draw the conclusion now that the automobile is with us; that it carries with it certain problems, and that we have to bend every effort to see that those problems are decided on the facts. And that also we have to bend every effort to see that we meet that competition in the best way we know how. There can be no question that the automobile sets a standard for our equipment and our speed that we have got to try to meet some way.

It is true equipment much superior to that which we are still running has been developed. It is also true that very few of us can afford to buy it. But we can do a great deal with what we have. And, as has already been mentioned, I think the paint bucket will go a long way to dress up our properties and get clear of what exists in so many of our cities, what I term a "bankruptcy complex," with respect to our street railways. We are not "through" and we ought to let the world know we are not.

Another conclusion that I would like to call to your attention is a statement concerning the number of vehicles passing a given point, which has a bearing on whether or not signals should be installed. This quotation states: "It appears that for traffic through intersections exceeding 10,000 vehicles in ten hours, the traffic hazard can be decreased," etc.

I do not believe it is simply the number of vehicles per hour through an intersection but rather the number of vehicles per hour in opposing directions that determines whether or not a signal is justified, because you may have a street or a highway

on which the traffic is extremely heavy and, nevertheless, unless the traffic in the opposing direction is also heavy you may find you will slow things up by putting in a signal.

Recently I had the pleasure of listening to Mr. Cottrell, of the California State Automobile Association, who advised his hearers that, after a study of traffic here in California, they had come to the conclusion that the minimum amount of traffic at an intersection which justifies the installing of signals is a total of 1,400 vehicles per hour for four consecutive hours, of which at least 400 per hour, in the same hours, are in the direction of the least heavy traffic.

CHAIRMAN WILSON:—Has any one else any comments to make? If not, the session will adjourn.

[The meeting adjourned at 4:15 P. M.]

TUESDAY LUNCHEON SESSION

JUNE 24, 1930

The luncheon session of the Transportation and Traffic Association convened at twelve forty-five o'clock, June 24, 1930, in the Fairmont Hotel, San Francisco, California, F. L. Butler, sponsor, presiding.

[Following the luncheon, Chairman Butler opened the business session by reading the report of the committee on Small City Operation as follows:]

REPORT OF THE COMMITTEE ON SMALL CITY OPERATION

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN:—This marks the close of the second year of activity of your Small City Committee. The Committee came into existence as a result of the inherent differences which now exist between the operating problems of the small city management and those of the metropolitan organization, and recognition of the fact that the methods of attack must be different. The serious condition in which small city properties now find themselves was made apparent to the members of last year's Committee. No report was published in 1929, as it was believed that the conclusions reached were based on insufficient data to justify an initial report. However, those conclusions were largely verified by this year's work. The record of that Committee contains the following statements:

"The importance of small city companies in local transportation is indicated by their service to 12½ per cent of the population of the United States and by their forming 60 per cent of the active company membership in the American Electric Railway Association."

"Small city companies are not earning a sufficient return upon their investment as transportation media to attract additional capital for permanence and expansion."

The Committee of last year sent questionnaires to small city operators and collected much valuable information about the condition of transportation companies in cities of 75,000 or less. Your present Committee has had this information available, as well as additional information which it has been able to collect. The membership of the Committee is made up entirely of operators having first-hand experience with small city problems, and they have given their experience and data from their properties to assist in the work for the present year.

Recognizing the difficulty of securing, analyzing and presenting statistics in such a manner that they would be of value to the industry, the Committee this year has attempted to present only the conclusions which the members were able to draw from information supplied by a number of representative properties. Each Committee member answered a questionnaire for the properties with which he is connected, and in addition the same questionnaire was sent to other properties with which members of the Committee are familiar. With this material at hand, the Committee met in a three-day session to formulate its conclusions. Eleven members were present at this three-day meeting.

The questionnaires covered operating methods, merchandising and publicity, comparative bus and rail results, general financial condition and other pertinent facts. Committee members were able to amplify these data by explanations and discussion.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are presented together, and are divided between the principal items of consideration. The Committee has made no attempt to give a detailed discussion of methods, as the Association has assigned much of this to other Committees for this year and years past. It feels that it is sufficient to direct attention to the various matters which are of first importance to the small city operator.

It is significant that properties where the most attention has been given to pricing and selling service have obtained the best results. This is a situation which has existed in other industries for years. It is no longer sufficient for a railway to provide dependable, safe transportation. That transportation must be supplied in the form in which the public wants it, and at a price which is competitive.

MERCHANDISING

Merchandising should be considered in connection with any change in service, equipment or fares. The maintaining and increasing of revenue is the solution of the problem on most properties, and sales can no longer be left to chance. Furnishing mass transportation, which once was a monopoly, is now highly competitive, as the service is no longer indispensable to a large proportion of people in all walks of life. They must be encouraged to become railway or bus riders.

Merchandising must go farther than advertising; the entire transportation organization and property must be groomed to sell the service. Shorter headways may be required, and this in turn may indicate the need for equipment of less capacity. Fares must attract both the regular and transient rider. Equipment must be attractive, clean and comfortable, and the track in sufficiently good condition to provide a smooth and safe ride. The advantages of the service can then be put before the public through skillful advertising. It must be kept in mind that there must be something real to advertise, or the public will be quick to recognize the discrepancy between the advertisement and the fact.

COMPETITION

Undoubtedly the private automobile is the real competitor of the small city transportation company. Operating costs of automobiles are being steadily lowered until the direct mileage costs are now close to the car or bus fares in many cities for short rides. This feature must be kept in mind when fare changes are contemplated. The proper fare structure for a given property will depend upon the local conditions peculiar to it. Most companies now favor a ten-cent cash fare, with reduced rates for tickets and/or some form of ticket which will appeal to the quantity user, often the weekly pass or the nickel pass. It is becoming more apparent that fares alone will not solve the revenue problem, quantity of service having an appeal that low fares do not have. Competition must be met by providing a service with distinct advantages. Speed and frequency have proven to be the most powerful means of holding the patronage of the automobile owner.

The Committee on Operating Economics has devoted a section of its report to the problem of bus substitution, in which the details of solving the economics of substitution problems are discussed.

BUS SUBSTITUTION

Buses offer several advantages to the small city operator which must not be overlooked. Bus substitution has, in a number of cases, brought increased fares without protest. Many cities have grown away from the old rail lines, and buses offer a means of extending service into sparsely settled sections, or localities where the future demand for transportation is doubtful. In general, buses require a lower investment, an advantage which is being offset by the increase in license fees and taxes. Rail-less service, by either bus or trolley bus, is subject to the same competition as car service.

The use of buses as feeder lines, requiring a transfer to the cars to reach the destination has not generally been successful. The vehicle must be run through to the passengers' destination.

The physical condition of the railway system must be taken into consideration. A depreciated system will cause loss of revenue, and a decision between reconstruction and substitution should be made before the service becomes so poor that the transportation system is discredited. Delay in reaching a decision can be fatal.

FRANCHISES

It is the general practice for rail and bus franchises to specify the streets over which the company has operating rights. In many instances this leaves the way open for other companies, usually independent bus operators, to secure rights on parallel streets, or over routes serving the same district, but not directly competitive in the limited sense of the word. This service handicaps the local company in its effort to provide orderly community transportation. The condition suggests the need of franchises which give territorial rights to furnish transportation.

The Association records contain much on the subject of perpetual franchises, terminable permits, paving relief, and service at cost, and it is not considered necessary to reproduce this material here. Much can be done in the small city by informing the public and public officials of the needs of their transportation company when new franchises are required.

OPERATING ECONOMICS

The splendid results achieved by some companies indicate that it is possible to adjust operating expenses to a very low level of earnings. The wide divergence between results on different properties shows clearly that many companies can reduce their operating expenses materially. There are many small items which must be watched, and which amount to only fractions of a cent per vehicle mile. They are, however, the difference between profit and loss.

Low operating expenses cannot be the final answer, if revenues continue to decline, and it is poor economy to cut expenses to the point where service is handicapped.

TAXES

Much has been accomplished in relieving transportation companies of onerous burdens often through new franchises. But the transportation industry is still heavily burdened with taxes on property, earnings, income, gasoline, bus seat miles (in some states) and other taxes of a local nature. The small company still finds too much of its revenue and its new capital goes to the maintenance and the construction of public works.

FINANCIAL STRUCTURE

Many companies find it difficult to justify modernization expenses because their present level of earnings is not high enough to provide a return on the present investment plus the new money required. Much of this trouble is caused by the fact that the original builders issued long term securities for which an adequate sinking fund was not created. The securities have outlived the property on which they were issued. Subsequent reconstruction has added to the original investment. Some properties with better than average revenues are handicapped because of the lack of flexibility in their financial structures. Other properties are being continued for reasons of expediency. These instances make up a sufficiently large proportion of the total industry to create a false impression about the ability of transportation companies to continue operations under the present conditions.

SUMMARY

There is no magic formula for the success of the small city transportation property. Individual conditions are controlling and must be expertly analyzed. The management cannot miss a single opportunity

to provide better service, secure added economies, or improve operating conditions. The greatest need is for skillful merchandising and all that is implied by it.

Respectfully submitted,

M. ACKERMAN,	WM. M. B. LORD,
H. BIGELOW,	CHARLES A. MEYER,
JOHN S. BLEECKER,	F. A. PERSONS,
R. F. CARBUTT,	R. E. PLIMPTON,
E. M. CARR,	J. H. PRITCHARD,
JOHN F. GALLAGHER,	P. T. REILLY,
H. L. GEISSE,	C. B. SHORT,
L. F. GILLET,	A. WILLIAM SPERRY,
A. H. GOSSARD,	G. W. WELSH,
J. A. GREENLAND,	H. E. WEYMEN,
L. W. HEATH,	F. L. BUTLER, <i>Sponsor.</i>
	A. C. SPURR, <i>Chairman,</i>

Committee on Small City Operation.

[Following the reading of the report, Mr. Butler presented the following prepared discussion of it:]

DISCUSSION OF SMALL CITY OPERATION COMMITTEE REPORT

BY F. L. BUTLER

Vice-President, GEORGIA POWER COMPANY, ATLANTA, GA.

We have before us for discussion at this luncheon, one of the most important subjects of the entire railway industry. Public transportation in the small city is important because this question is now being faced in every section and in almost every state of the Union. The proper solution of the problems confronting these smaller properties is vital to the growth and economic life of the communities served.

The committee on Small City Operation has, during the last two years, given a great deal of careful study to the preparation of its reports and the facts and statistics set forth in the reports of 1929 and 1930 picture for us a condition that is startling.

Any community that expects to expand and prosper necessarily requires some form of dependable and economical public transportation. This is common knowledge not only to transportation men but also to city authorities. With this knowledge, it seems logical to assume that all forward-looking city officials would be glad to give to its local operating company the needed cooperation to assure its successful operation. My belief is that the first step to take in working out a solution of the difficulties faced in the smaller towns, is to take not only the city fathers but also the local public into our confidence and ask their aid in solving the problems that affect them as greatly as ourselves. With-

out such help I would say the situation is hopeless. However, it should not be difficult to convince anyone that to meet the demands of a growing community capital will be needed to expand the service.

In fairness to all, capital is worthy of its hire as is the laborer, and money is not invested unless there is assurance of its return and also an assurance that it will earn wages while doing its useful work.

With the public's cooperation assured them, comes the problem of what to do. Here is where a knowledge of our work, an understanding of local conditions, and courage to carry out that scheme which seems best, is required.

These reports, the one for 1929 and this year's, should be of assistance. See what they say on merchandising, on operating economies, perhaps your taxes are over burdensome and should be reduced, or perhaps the financial structure is handicapping your property because long term securities were issued and no adequate sinking fund provision made. The pruning knife may be needed here as much as on taxes.

Read also what the reports say on bus substitution. Perhaps the automotive form of transportation that was the instigator of our downfall will prove to be the implement of our salvation.

CHAIRMAN BUTLER:—The attendance here today indicates the interest in this subject. There have been certain men assigned to discuss it. You have heard the report as it was submitted by the committee.

It is now open for discussion.

JOHN H. PRITCHARD:—I am a member of that committee. I don't think I can add anything to the report, but I would be pleased to answer any questions on how we went about getting the information from each member.

Each member of the committee received a questionnaire to cover all the properties that he represented. He was called before the members of the committee, who were present in New York this spring, and answered all questions that could be thought of by each member of the committee present. And that is how the report was arrived at.

For instance, in the matter of bus substitution where you have a feeder bus and street car, they arrived at the idea that it wasn't proper to run a bus for just part of the way and then transfer to a street car, and run the rest of the way downtown in the street car; it was better to operate all the way with one service.

This is the way we arrived at a question like that—just by

answering questions put to each man by all of the members of the committee. The man was put at the head of the table, and the statistics were put on a blackboard beside him, and they went pretty thoroughly into the whole question, all the way from the financial setup to the different methods of operation, like questions on headways or things like, "How do they use the men?" Most of them weren't bothered with unions, so they could take a man from the shop and use him part of the time as an operator on a bus or street car or they could use him part of the time as a lineman. Those that seemed to have the best results among the small cities were properties that operated in that way. They had to.

I believe Mr. Short can give you some better pointers than I can, especially on the merchandising end.

FRED H. CHESTNUT:—I would like to ask Mr. Pritchard if the remark he made about running buses through from outside of the town was the general conclusion?

JOHN H. PRITCHARD:—Yes, in the smaller cities. They were considering cities below 100,000 population, most of them around 40,000 and 50,000, and even smaller than that. The opinion, and the experience of the members, was that it did not pay to operate feeder buses, or transfer buses, for just short distances to a street car. The distances are too short in a city of 75,000 or less population.

FRED H. CHESNUT:—Was this at the same fare, or at an increased fare over the combination of bus and street car fares?

JOHN H. PRITCHARD:—The manager of the Coast Cities Railway Company at Asbury Park, New Jersey, brought up the fact that he had substituted buses for street cars and had gone to a straight 10 cent cash fare for the bus at the first substitution, whereas the street cars had been operated at a 7 cent cash fare, and he had no trouble with the ex-car riders.

We had the same experience in Huntington, West Virginia. We had a feeder line and operated one street car over a one-way distance of one mile, operated on a fifteen minute headway. It came to within two-thirds of a mile from the down-

town business section of the city—about 75,000 population. We put on two buses in place of that street car and ran them down-town.

Before we made the substitution we took in about \$135.00 a week. Now it is around \$370.00 a week for the two buses that replaced the one street car.

That was one of the examples we used in arriving at that conclusion.

FRED H. CHESNUT:—Was it your conclusion that the time saved by the bus was considerable?

JOHN H. PRITCHARD:—No, we didn't have so much information on that. It wasn't the difficulty of the substitution of a bus in place of a street car; it was the idea that a passenger should be brought all the way to town and not be made to stop half way out and transfer to some other line.

CHAIRMAN BUTLER:—I think the consensus of opinion of the members of this committee was that if you transferred your passengers on a short haul it discouraged your riding; rather than do that the conclusion was that buses should be run through on small properties.

A. C. BRADLEY:—Was this new operation on a longer headway?

CHAIRMAN BUTLER:—No, I think the committee felt that a frequent headway was necessary to encourage riding in a small city and to discourage the walking habit, if possible.

C. B. SHORT:—It was the opinion of the committee that passengers objected to transferring and the idea was to avoid such transfer as much as possible.

On our property at Roanoke, Virginia, we serve a population a little over 80,000. At present we have two feeder buses, one on each of two routes about a mile long. We transfer at the end of the street car line to the bus. These operations have been in effect about three years and have been very unsatisfactory. As soon as possible we are going to discontinue either the car or the bus. People object primarily to the transfer required.

Up until the first of April this year we issued free transfers from the street cars to the bus and vice versa, but about the first of April we put on a 3 cent transfer charge. And we are hauling fewer passengers and taking in less money.

E. W. FLORENCE:—I think we are getting at the wrong end of the horn. I don't think it is so much a matter of equipment and service as it is trying to sell the public the idea of the service. This is our transportation problem. We have a lot of problems in the city of Sacramento. We are operating 74 cars and five buses as feeders to the cars. Night baseball has been put on in Sacramento and I am going to recite a few instances to show you the effect of this service on the public.

The first game was between the baseball clubs of Oakland and Sacramento. The Oakland Chamber of Commerce made up a special train to come to Sacramento; it carried about 450 passengers. We advertised in the paper that our car line would run direct to the ball park, clear to the end of the line, without any transfers or stops. That was very well advertised. But the Chamber of Commerce of Oakland made arrangements with the taxi lines to meet that train and haul the passengers to the ball park in buses or in taxicabs. They did the same thing in Oakland. The result was that out of the 450 or 500 passengers on the train we hauled two on our street cars.

That was direct service. The trouble was the Chamber of Commerce was of the opinion that people were opposed to street cars due to radio interference caused by them. We have done, of course, all we can to eliminate this interference.

The papers were maintaining that the car lines interfered with down town traffic and recommended substitution of bus lines. The people then petitioned the Council that the car lines were enhancing the value of their property and that if buses were substituted the transportation company could remove these buses if it so desired, leaving them without service. Therefore with the public press, the people and the Chamber of Commerce advocating different means of transportation, the street car company has plenty of problems.

Our principal problem is to sell the public on the service. That is what we have to do. We lie awake nights thinking

about it and the Railroad Commission has used every method possible to solve this problem in Sacramento.

We thought we had it licked for a couple of years. Then two other companies got busy. They ran small equipment, small feeder lines, into town; and they have been making money while we have been in the red for the last four or five years. We have done everything possible. We have been before clubs and before church organizations, we have advertised, we have provided Sunday passes, weekly passes and school passes; we have done everything to encourage riding.

I might recite one case. A complaint was made that our equipment was old;—"If you buy new equipment, I am sure you can increase your traffic."

"All right," we said, "you check a street and we will buy the equipment and put it on."

They took one of the oldest residential streets in the city, a short haul of 18 or 20 blocks. We put this equipment on—the newest and latest equipment we could purchase. Immediately the revenue fell off \$25.00 a day. [Laughter.] I knew one of the residents of that section so I went over to call on him. I said, "What is the trouble with our service on that street? We bought the latest equipment, and the revenue has fallen off."

"I'll tell you," he said, "we are old people and we are used to the old equipment we have been riding on for years. You gave it to us in one big dose, instead of giving it to us gradually. You have made a radical change and we are not used to such changes. If you had gone at it in a slower manner and had given it to us in smaller doses it would have been better—but I am walking down-town now and my doctor told me it was going to do me good."

Then we switched around, took the new car off and put on the old; and the service started to go up again.

Fortunately, they have built a junior college at the end of the line which has increased the service. But the new equipment on that street has been taken off and put in service on another street; we just switched back and forth.

I can recite a lot of cases of the various things we tried with some very startling results.

J. M. POGUE:—What is the population of Sacramento?

E. W. FLORENCE:—At the last census, 84,000.

LABERT ST. CLAIR:—Have you tried selling weekly passes and tickets directly to the home?

E. W. FLORENCE.—We sell them on the cars; in some places down-town and have sold them to the department stores which have given them away with \$5.00 purchases.

LABERT ST. CLAIR:—I think Mr. Short tried direct solicitation at one time. I am interested to know if he is still carrying this on. Mr. Short, are you still selling directly to the home?

C. B. SHORT:—Our weekly sales don't warrant that. It ran up to almost 30 per cent of our gross, so we eased off temporarily pushing the sale of weekly passes. But now the slump that is prevalent throughout the east has struck us and we have a little campaign on right now. I haven't any reports from it yet. We started the day before I left home, nearly two weeks ago, organized our men and we put up cash awards. We do not pay our men a bonus for selling weekly passes, but we divide them into groups, the day car men and the day bus operators, and award first, second and third prizes. We take the night men and do the same thing; also the extra men. The prizes are the same in each case. I don't think it is fair for a bus man—all of our bus equipment is small, 21 passenger—to be penalized for not being able to sell as many passes as the street car operators who handle several times as many passengers.

We have obtained some good results from these campaigns. We work different stunts in connection with them. Sometimes we post a notice a week in advance that we are going to run a campaign for two weeks, three weeks, four weeks, or whatever time may be determined. We will go through with that. Then a few months later we will post a notice that a campaign has been on for one week—we make that retroactive—making the campaign last for two weeks, so the operator who has not been pushing the passes has automatically cut himself out of the money. We try to keep them guessing all the time. As a result of that the operators have regular pass customers. They never know when they are in a campaign. Frequently I don't know myself.

There are various methods that we have adopted, not only in pushing the sale of passes, but in the merchandising of service. I think the most important part of my work is the consideration of merchandising efforts. We have used the local radio station, broadcasting nightly, six nights a week, broadcasting the names of two persons to whom free passes are issued, and those names are selected with a great deal of care. We try to use names of women much more than men on the theory that women talk more than men. And we find that it has been very satisfactory.

We did that for about three or four months. We cut it out during the hot wave, but we expect to resume it in September.

We try to pick key-women or key-men, as the case may be. We go into a neighborhood and find a lady who is well known; we will select her and broadcast her name. Those few neighbors who do not happen to be listening in you can rest assured usually get the information the next day.

We have had some funny incidents. I have had ladies stop me on the street and tell me how badly they wanted to hear their names over the radio. I had one lady stop me on the street and say that she was anxious to hear her name over the radio, and wanted to know what night we could broadcast it. When I got to the office I found that we had an opening the following Tuesday. I put her name on the list and telephoned her that information. That lady gathered in a whole lot of her friends to hear her name come in on the radio. [Laughter.]

CHAIRMAN BUTLER:—Mr. Short, you have just put on some new equipment. Tell us how it is working.

C. B. SHORT:—I have charge of two companies—one at Roanoke where we serve a population of over 75,000 and one at Lynchburg where we serve about 40,000. We have 19 regular scheduled cars and had been using a 12 minute headway. In riding on that 12 minute headway, you would have thought you would never get there and would want to know what the trouble was.

We got 20 new one-man cars, and put them into service the first of the year. Incidentally, up until the first of the year we had had only two-man operation. They are quick, snappy cars

—and we put them on a 10 minute headway, without making any track changes and without adding any switches. We got new snappy uniforms, of a khaki colored cloth; and put a mirror in the showing-up room so that as the men entered the door they couldn't help seeing themselves. We also put a notice on top of the mirror reading, "Before you go out to represent this company look and see if you do."

In changing from two-man to one-man operation, we did something there that we realize would be difficult to do on some properties, we temporarily discarded our seniority list. We picked the operators and the old men who couldn't handle the cars and keep a schedule were just simply put on the shelf, and we put young, snappy fellows, who are keeping up the schedule, in their places.

We have three divisions in Lynchburg. We did not attempt to go to one-man operation on all three divisions at one time. Lynchburg is an old town—one of the oldest in the south. The people are very conservative and very slow to make changes. So we took one division, that had only two cars, and we put on the one-man cars. We operated them first on the 12 minute headway, the old slow headway. Then we took another division, with 8 cars, and did the same thing. We educated the people to the one-man car idea first. We finished up the first of April with 100 per cent one-man operation and on a 10 minute headway.

CHAIRMAN BUTLER:—What has been your return, financially?

C. B. SHORT:—We were expecting to get some mighty fine figures but, unfortunately, due to this industrial slump it is very hard to tell the direct result of the new equipment. The figures show that for the first five months this year we have a decrease of 2 per cent in gross receipts.

CHAIRMAN BUTLER:—That is very good, compared with the rest of the companies represented by those here.

C. B. SHORT:—In Roanoke the first five months this year we fell off. Compared with the same time last year, we have a decrease of 3 per cent in vehicle mileage, a decrease of 4 per

cent in the gross receipts. But how much of this is due to the industrial slump it is impossible to say. The very fact that the decrease in Lynchburg was only 2 per cent, against the 4 per cent in Roanoke, looks good for the new equipment.

JOHN H. PRITCHARD:—Did you pension the old men that you took off?

C. B. SHORT:—We have no pension system, but we put them on a payroll, which is practically equivalent to a pension, although we don't call it a pension. They are simply placed on the payroll and told to go home and stay there until sent for. Since that time five of those old men have died. We have restored the seniority list and everything is going along fine.

E. W. FLORENCE:—We had the same condition that you had in Roanoke. On our application to the Commission their decision was for the company to operate one-man equipment. Sacramento is a very strong union town and immediately there was a wail to high heaven against the one-man cars. So, the City Council passed an ordinance and submitted it to the people for vote, and it was carried, against the one-man operation. In thirty days it went into effect. Everybody was wondering what they were going to do with the cars that could accommodate only one man. We didn't tell them what we were going to do, but we put two men on each car, and put one right in front by the door so the people stumbled over him as they came in and went out. The result was it so disgusted the people that they finally asked for a rehearing of the case. It was again submitted and this time defeated.

Immediately the unions called a mass meeting and instructed their members to enter the equipment with big money, \$10.00 and \$20.00 bills. Their idea was to tie up the schedule. We put collectors on the street and that move was overcome very quickly; it only lasted a couple of days. We are now operating one-man equipment throughout, buses and everything else, and the operators are interchanging.

As far as the old men are concerned, we have one man who has been with the company 38 years; he is operating a one-man car, and he is one of the best one-man operators we have today.

He is always on schedule and hasn't had an accident in 38 years—this is a very wonderful record.

CHAIRMAN BUTLER:—Has anyone else anything to say or any solutions to offer to this problem?

A. C. BRADLEY:—Our traffic department is contemplating, in a city of 78,000 which now has a 7 cent fare, dividing it up into 5 cent and 10 cent zones, thinking that it will stimulate the use of the service. They figure, at the start, that they will lose a little. I was wondering if any of the others have made such an experiment?

C. B. SHORT:—Would that mean, in effect, a reduction in fare to a certain number?

A. C. BRADLEY:—Yes, and an increase to others.

C. B. SHORT:—I had some experience in the past year in reduced fares, and if I ever reduce another one I hope somebody will shoot me. [Laughter.]

W. N. CLARK:—We have been considering reduced fares for a property such as ours serving about 60,000. Has anybody had experience with the reduced fare for evening travel, this reduced fare to start at 7 o'clock in the evening, a round trip fare, for example, of 10 cents where the regular fare is 7 cents, the round trip being good for that one evening only?

C. B. SHORT:—Have you had any experience with a shopper's theatre pass?

W. N. CLARK:—No, we haven't.

C. B. SHORT:—I know of one company that has that in effect, along with other different forms of passes; and they are well pleased with it. It is good from 9:30 A. M. until 4:30; and from 6:30 P. M. until midnight. I think the price of that is 50 cents per week.

W. N. CLARK:—Is that a weekly pass?

C. B. SHORT:—It is a weekly pass called a shopper's theatre pass. We have that type of fare under consideration now.

W. N. CLARK:—We have pretty good riding throughout the day but after seven o'clock very few people ride. Everybody drives to the theatre in automobiles. This round trip fare would be good only to the down town section and back again. It looks as if such a plan would increase night travel.

E. W. FLORENCE:—Do such tickets entitle them to the show for a certain consideration? Or do you only give them a street car ride coming and going?

W. H. HEUN:—We are trying that out at the present time. The results have shown that we haven't increased our revenue, but we get good advertising on the screens nightly.

MAXWELL E. BENSON:—I would like to say, in this connection, that in Nashville one theatre in particular refunds the round trip street car fare, in the form of street car tokens, to any street car patron who presents the coupon at the box office. This coupon is taken from the street car pamphlet, thereby avoiding the necessity of the conductor issuing coupons.

C. B. SHORT:—I happened to be in Richmond, Virginia, a few months ago, and I learned that the companies there issue a transfer to a theatre. The transfer is presented at the theatre ticket office when the patrons buy their tickets and a token is given them. I followed this up and found the railway sold about 125 tokens per day through that method. The theatre bought the tokens at the regular price and distributed them in that way.

E. W. FLORENCE:—Something similar was tried out in Sacramento. Two department stores paid the regular price for the tokens and gave them away with every \$5.00 purchase. But they had to discontinue because there was no call for them.

CHAIRMAN BUTLER:—In merchandising our proposition, in Atlanta, we have tried several schemes. One was with one of our large department stores. They did all the advertising, and purchased the tickets from us at the regular price, 7½ cents

straight, and gave away two tickets with every dollar purchase. In one day's sales they gave away 13,000 tickets.

We also had another proposition with a grocery company in Atlanta that operated 150 grocery chain stores. They put on a bread campaign and gave with every two wrappers a street car ticket. I hesitate to say now how many tickets they gave out in that way. But it is a good method of merchandising. Any scheme to get the tickets into the hands of the public, we felt, is a good merchandising proposition.

We work with our merchants in a number of different ways. They usually use them in this manner—they do all the advertising, saying they are going to give away these tickets with a stipulated amount purchased, and it has been profitable to us and to them.

I know one store that gave away 13,000 in one day, which indicates that 6500 people entered their store and made a purchase of at least one dollar. They had to in order to get two tickets. That was a very profitable day.

C. B. SHORT:—We leased our lines at Roanoke for one hour to a big department store. Everyone who got on the cars or the buses during that hour was handed a card reading, "You are riding with the compliments of the Hancock Clay Company." The store had a sale on. We plugged up the fare boxes so that a passenger couldn't drop anything in. The idea was very successful.

CHAIRMAN BUTLER:—That has been tried in Atlanta also.

W. H. HEUN:—What did you charge them?

C. B. SHORT:—We charged them depreciation, taxes, etc., and fixed our operating expenses at a 7 per cent return.

R. E. PLIMPTON:—During the last few years I have had the opportunity of studying the cars and buses in what we call the smaller cities, and I have been impressed with the conditions of rough riding prevailing in most of those cities. This may be why so many people use their own automobiles and so few use the street cars. The discomfort is partly due to the vehicle, which in many cases is old, but it is due even more to the poor

right-of-way. When I say "right-of-way" I mean the rails or highway. I was wondering, while Mr. Pritchard was outlining the report, if that phase of it had been considered in preparing it?

JOHN H. PRITCHARD:—They discussed the weekly pass and found that one particularly successful operation of this was in Levis, Quebec. The point was brought up as to the correct proportion of the price of the pass as compared with the cash fare or token. The person who rides only occasionally ought to pay more per ride than one who rides regularly. You ought to have a 10 cent cash price for the occasional rider and possibly 3 for 25 cents, or 6 for 50 cents, for the regular rider. That would be a good combination to go with a dollar weekly pass.

We had an experience at Huntington, West Virginia, with the weekly pass. We had been operating with a straight 6 cent cash fare up until last June. We applied to the West Virginia Commission and they gave us a temporary schedule of 8 cents cash fare, or 4 tickets for 25 cents, and a \$1.10 weekly pass. We didn't put on any strong campaigns for the passes, but we paid the operators 5 cents for each pass they sold. We sold only about 650 in any one week; that was the best we did at any time with that combination of fares.

The first of this year we decided that the pass wasn't priced right so on our own hook—we didn't ask the permission of the Commission—we made it a dollar instead of \$1.10. We sold, I think, as high as 1200 in one week this spring. The operators pushed their sale a little bit harder than the \$1.10 passes were pushed but doubled the number of passes sold in a week. The gross revenue in that town this year, to about the second week in May, on the cars and buses together, was about $2\frac{1}{2}$ per cent greater than for the same period last year.

We recently remodeled some of our equipment. We had 40 cars purchased new in 1923 but they had hardwood slat seats. We put on deep leather cushioned seats. Then we substituted two small 21-passenger buses on this one short street car line that I spoke of. On another route where we had been running two buses on a straight 10 cent fare with no transfers, we put on the same token and pass fare as we had on the cars, kept

the 10 cent cash fare and gave free transfers. The mileage increased about 10 per cent, along with a $2\frac{1}{2}$ per cent, or the cars, but we had that increase in gross revenue.

We don't know whether it was on account of the buses being coordinated with the street cars or the improvement in the cars, but we had that increase in gross revenue.

Huntington had been operating five city car lines into the down-town district, one of which was a through line (it ran through the down-town district from one side of the city to another). After the rerouting program was completed there were only two lines left that looped around in the downtown district, the others having been tied together to make through lines. The schedule speed of the system was increased slightly, one 18 hour car was cut off and the headway was not increased on any line.

You see then, that the dollar price more than doubled the sale of passes without reducing gross revenue. So the pass ought to be considered as a means of at least holding the present regular riders.

A. C. BRADLEY :—What is the average sale of the passes?

JOHN H. PRITCHARD :—We kept a count of the passes—and the number of rides per pass runs about 26 or 27 a week.

A. C. BRADLEY :—Did you continue the 5 cent commission?

JOHN H. PRITCHARD :—No, only when they have a campaign on. They have a campaign only about once in three months, and during that campaign of about two weeks they give prizes, and also a 5 cent commission on each pass sold.

You would be surprised to see how the men get out and work; they even have the members of their family working for them.

E. W. FLORENCE :—As far as our company is concerned, our service and the time schedule can't be questioned. In fact, we have been arrested a couple of times for exceeding the speed limit right in town.

I think it resolves itself down to this: If any of the men have had any experiences with bus lines down-town, whether the

results be favorable or unfavorable, the committee ought to send out that information to the operating companies that are interested. It seems that they have tried everything in the congested territory but bus lines without any stopover privileges. I don't believe anybody has tried that in a small city.

C. B. SHORT:—I might say that at Roanoke, where we operated about 140,000 bus miles per month and 135,000 to 140,000 car miles per month for the first five months of 1930—all the buses, except two feeder buses, operated straight through to the down-town section. This year the bus revenue has increased 2 per cent, and the bus mileage 3 per cent, compared with the same five months of last year.

E. W. FLORENCE:—Did these bus lines parallel the car lines or did they operate on streets away from the car lines?

C. B. SHORT:—Both.

E. W. FLORENCE:—Doesn't that decrease your car operation?

C. B. SHORT:—The lines have been there for four years.

E. W. FLORENCE:—And they run parallel?

C. B. SHORT:—Yes, sir.

E. W. FLORENCE:—In most of the California towns the streets run to a given center, and bus lines have to parallel or run on a street a block away from the car line.

C. B. SHORT:—Our buses operate on streets one block from the car line down-town, due to some extent to the comparatively small business district which has developed in years gone by along the street car lines.

E. W. FLORENCE:—Doesn't that interfere with your short-haul riding?

C. B. SHORT:—To some extent.

A. C. BRADLEY:—During our rush hours the buses are overloaded and the cars have a little more surplus space; we do not permit the buses to do local work on the main street where cars are also operated. This makes the short riders use the cars.

C. B. SHORT:—Generally speaking, our bus routes are shorter than the car routes.

We bought out a competing company in June 1928, and had quite a fight for two or three years. When we bought out this company we re-routed its buses which were paralleling our car lines wherever they could. Shortly after that we not only increased the fare on both the buses and the cars, but we re-routed the buses and got them as far from the car lines as we could.

E. W. FLORENCE:—The reason I am interested is that we have in mind now running a bus line clear from the outskirts of the city into the congested areas.

A. H. GOSSARD:—Subsidiary companies of the Middle West Utilities Company are operating some 38 street railway and bus operations in cities below 150,000 population. We are very carefully considering now what might be termed a market survey. We would like to find out what the public really wants. If we can determine that, we feel we can provide the right kind of transportation.

We have some cities that are 100 per cent bus; we have a good many that are 100 per cent railway; we have some that are both railway and bus. The buses in some cases are producing good results, and in some cases they are not doing so well. We are a little bit undecided ourselves. We feel that if there is a way in which we can have a market survey, by obtaining the names of all of the prospective and present riders, to find out exactly what they want, we can furnish the right kind of transportation.

We are trying to have an open mind, and I believe that we have an open purse. We want to get the best results.

CHAIRMAN BUTLER:—Mr. Gossard, the committee on The Passenger deals with this very thing. It will be reporting at the Thursday Session of the Transportation and Traffic Association. It is taking surveys of six cities following the plan you outlined. Mr. Holden of San Antonio took such a survey last year in a small section of San Antonio and had very good results. He thought it gave him a good picture, and he included

an account of it in last year's report of the committee on The Passenger. The committee will have something further to say on that subject Thursday morning.

A. H. GOSSARD:—I think that should be done in all cities.

C. B. SHORT:—I might say that Roanoke, Virginia, was included in the committee's list; in fact, the first survey was made in Roanoke.

I have a copy of that survey here and if any of you are interested I would be delighted to show it to you.

A. H. GOSSARD:—I would like to see it.

It is going to cost a little money to make such a survey, but we believe it is well worth while.

C. B. SHORT:—I was surprised at its low cost. We did it with our own men. It is very, very interesting, and you can get wonderful information from it.

E. W. FLORENCE:—Before we adjourn, I suggest that we ask the committee to start a campaign throughout the United States to have a "Ride the Street Cars Week." They have everything else.

CHAIRMAN BUTLER:—That is a good idea. I will suggest that to the Executive Committee.

If there is nothing further to come before the meeting, we will adjourn.

[The meeting adjourned at 2:35 P. M.]

WEDNESDAY AFTERNOON SESSION

JUNE 25, 1930

The second meeting of the Transportation and Traffic Association convened at 2:35 o'clock, June 25, 1930, in the Fairmont Hotel, San Francisco, California, First Vice-President, Paul E. Wilson, presiding.

CHAIRMAN WILSON:—The first thing on the program this afternoon is the report of the committee on Operating Economics. Mr. Joe R. Ong, chairman. Mr. Ong is not here and, in his absence, the report will be presented by Mr. J. B. Stewart, Jr. Mr. Stewart!

[Mr. Stewart then abstracted the report which is printed in full as follows:]

REPORT OF COMMITTEE ON OPERATING ECONOMICS

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN: The subject of Operating Economics is new to the Association in name only. Many committees have made excellent reports on selected phases of the economics of transportation. The title "Operating Economics" is so broad and all inclusive that the Committee was faced with the problem of restricting its activities, particularly in this short association year.

With no precedents to follow and no limitation upon its assignment, it seemed best to set forth in one general Section A those operating practices which have been found beneficial on one or more street railway properties. By this it is not intended to offer any general panacea for all the ills that may have befallen our industry. There is, however, a rule of rather wide application that most of us can learn how to do a thing or two a little better from someone else. Our survey of operating practices, perforce, has been limited.

It will be betraying no secret to state that this matter has been approached from the general manager's viewpoint because this phase of the Committee's work was in the hands of a general manager. Naturally many items not strictly transportation and traffic will appear. There is no intention to encroach upon the prerogatives of the affiliated Accountants, Claims or Engineering Associations. The acceptance of the managerial viewpoint seemed logical and proper.

Section B relating to the use of one-man cars very briefly summarizes the present situation respecting this matter and calls attention to the

increasing economic importance of studying their application on every property.

Section C points out the items which must be studied when considering the substitution of buses for street cars. On many larger properties with technical staffs, this may not appear as helpful as on those not fortunate enough to have an extensive staff.

Section D has been given the rather plain title of "business getting" as this seemed to be a real problem faced by so many companies. The Committee undertook to make some study of this matter but as the investigation developed, it appeared that this was not properly a subject for us to pursue. Further reference appears in Section D.

Section E of the report relates to fares. Almost without exception street railways have been faced with the necessity of fare increases within the last decade and a half. Fare increases affect the number of riders as well as the total revenue. A limited analysis of the effect of fare changes is presented.

A—OPERATING PRACTICES

In 1925 A.E.R.A. committee on Management and Operation prepared a very comprehensive handbook on "Modern Electric Railway Methods and Practices." This handbook of more than 300 pages was completed after nearly a full year of investigation work and the material included was secured largely through personal visits of the fifteen regional directors to the various properties and covered the new methods and practices in use on practically every street railway and interurban line in the United States and Canada. This report was followed by similar reports on this subject in 1926 and 1927. Time has not permitted your Committee to make as exhaustive a study of the new ideas tried out on all of the railway properties as was made in connection with the preparation of the handbook mentioned above nor do we feel that any great amount of good could be accomplished by covering the same ground again. Many of the ideas therein contained are excellent and could well be applied to a number of street railway properties at this time.

As we view the subject under consideration the ultimate objective of the Committee is to set forth those applications of modern methods and practices which will

- (1) Increase the gross revenue of the operating company.
- (2) Decrease the operation and maintenance costs.

In treating these phases of the Committee's work there naturally arises a certain overlapping of accomplishments. To a large degree any steps taken which provide better service will result in some increase in gross revenue. Likewise the purchase of new equipment may well be expected to show results in all three divisions. In the detailed study which follows we have endeavored to place the changes under the heading which constituted the primary object of the change.

1. Operating practices which have resulted in an increase in gross revenue

This vital problem of the industry which has constantly faced the operators of every electric railway in the country since the increased use of the privately owned automobile is apparently looked upon by many companies as a question without an answer. This Committee does not pretend to have found a solution which can be applied to every traction line in the United States but we are not ready to admit that there is no answer. While the electric railway riding habit of pre-automobile days may be a thing of the past, some companies have succeeded in stopping this annual decline and in several outstanding examples have actually increased their riding and their revenue during the past few years. The ways and means of accomplishing this feat are many and varied. The answer in every case, however, has been found by making a rather complete analysis of the losses and discovering wherein conditions could be changed so as to recapture this loss of business. All too frequently the answer has been that the street railway company had failed to keep abreast of the growth of the community which it served. To induce the public to use our service we must first of all endeavor to give the public what they want or at least provide a service which will prove to be convenient to the public.

In the larger cities the people have moved away from the old established car lines and if we are to reach these people we must change our car lines or furnish a substitute service. Every city which has shown an increase in the number of passengers hauled annually has secured this increase through an extension of car lines or the installation of an auxiliary bus service. One property awoke to the solution of its problem in 1928 and by giving an improved and expanded service increased its riding 11.8 per cent over the previous year and its gross revenue 13.2 per cent. The same property showed an increase of 5.25 per cent in passengers carried and an increase of 5.35 per cent in gross revenue in 1929, showing that the results obtained by improving the system were not of a temporary nature. Rearrangement of the system, abandonment of non-paying trolley lines and track improvement have given equal results on other properties. New cars installed in service on one city property resulted in an increase of 3 per cent in passengers carried over the previous year although other lines not so equipped, showed a decrease. Changes in car and bus seats to provide a more comfortable ride have resulted in increased use of the public transportation systems in other cities.

But rehabilitation of the system and expansion of service are not the only possible ways to secure an increase in gross revenue. Some companies have shown an increase in riding and gross revenue by the use of more flexible fare schedules so that they may stimulate the use of their service through special selling plans. One property showed a substantial increase in gross revenue through the elimination of transfer

abuse. Another property added \$70,000 per year to its gross revenue by a change in the type of transfer and by installing a plan whereby the transfers were dropped into a locked box at the end of each round trip. Several companies that have gone into the bus operation have found a profitable field in the sale of chartered service. Other companies have installed special express service to provide a quick way for residents of the outskirts of the city to reach the business center in the shortest possible time and in this way have overcome the time advantage commonly attributed to the privately owned car.

The substitution of a deluxe motor coach service to replace a run-down trolley system in several small communities resulted in a revenue increase of from 4 per cent to 6 per cent. Special motor coach service to swimming pools during the summer months provided a profitable business in one city. Another company reports that a special deluxe service to a popular public ballroom has developed extra riding. Several cities confronted with a demand for crosstown service have avoided heavy expenditures by installing bus lines and, while the results obtained have not added materially to net revenue, they have increased the gross and have popularized the use of the service.

On one property the installation of four-motor equipment to replace the former two-motor operation resulted in an increase of 12.3 per cent in revenue per car mile, all of which can be credited to increased schedule speed as there were apparently no other factors entering into the situation. Another line on the same property showed an increase in total passengers of 5.25 per cent when schedules were speeded up through the use of faster equipment. The question of schedule speed has a large bearing on passenger haul under present day conditions. Coupled with faster schedules is the need for smooth tracks; the public wants both a fast ride and a comfortable one.

2. Operating practices which have resulted in decreased cost for operation and maintenance

During the past ten years managers have heard so much about operating economies and ways to reduce operating expenses that one might well believe that little could be added to the long list already submitted. It is not the intention in this section of the report, to recite a list of outstanding economies in operation which have and will continue to produce large annual savings such as one-man operation or use of lightweight equipment. Suffice to say that in our opinion these economies are worthy of the consideration of every operator who has not yet availed himself of their possibilities. The practices which we hope to submit in this section are those which, because of the fact that the individual saving may be relatively small when expressed as a percentage of gross revenue, are frequently overlooked but which, taken as a whole, represent a substantial saving to the industry.

In the transportation department any steps taken which result in a reduction in car miles or in car hours will produce a saving in the total

cost of operation. On some properties it has been possible to materially reduce the annual car miles operated and yet provide the same or a better standard of service through a system of traffic checks properly coordinated with a more flexible system of schedules. In this way it is possible to obtain a more nearly perfect balance between demand and supply of service and at the same time reduce the total number of car miles operated. One company reports a saving of \$110,000 per year by rerouting certain lines. Another company has reduced its car hours by installing loading platforms with street collectors to speed up boarding. The use of electric track switches has resulted in elimination of delays on other properties. Treadle doors installed on existing equipment has resulted in a marked improvement in schedule speeds in another city. Many properties have reduced their running time by increasing the spacing of their stops.

In some cities where car lines or bus routes are rather long, cut-back points have been established so that only a portion of the service operates to the outermost terminal of the line, thus not only reducing the total miles operated but also providing more frequent service for the short haul passenger. A study of the location of carhouses in relation to the lines they serve, will sometimes enable the operator to reduce the non-revenue mileage by shifting the operation of a certain line from one carhouse to another.

On many city properties the cost of paying extra men to report for extra runs amounts to a considerable sum during the course of a year. There is naturally a tendency on the part of dispatchers to play safe and call for reports from enough extra men to take care of any extra runs which may arise. Frequently more extra men are called than can be used and these men must be paid the reporting time whether they are used or not. By cooperating with manufacturers in regard to changes in labor conditions and by watching weather conditions and other factors which influence the peakload riding, it has been possible to materially reduce this reporting time on some properties. One company reports a saving in reporting time amounting to \$6,800 during 1929 as compared with 1928.

Several companies operating a coordinated car and bus service have been able to reduce the cost of their so-called "owl" car service between 12:00 o'clock midnight and 5:00 o'clock a. m. by substituting buses for street cars. Incidentally this plan of operation has an added advantage in that it gives the track department an opportunity to open up tracks in the congested area at night without having to provide a means for cars to operate, thus greatly increasing the amount of work accomplished by this department. While no specific instances have come to the attention of your committee, it would seem quite possible to further increase the use of the bus as an auxiliary during periods of light load.

During the past few years more attention has been given to the matter of power costs. Many companies have inaugurated power saving campaigns which have resulted in substantial reduction in power consumption.

Other companies have either improved their own generating stations or have worked out power contracts with generating companies. One company reports that it has increased the number of substations and at the same time converted all of its substations into automatic operation, thereby not only greatly improving its power supply but also reducing its cost of operation.

In the bus operating division of the various street railway companies new methods have been devised to insure low operating costs. One company puts every new driver through a ten day course in its garage before sending him out on the road. In the garage he sees the actual results of careless driving and the result has been that all drivers who have served this period in the garage, handle their buses with less abuse.

Bus operation lends itself particularly well to plans for reducing non-revenue mileage. Because of its flexibility, it is possible to so route the bus that what would ordinarily be non-revenue mileage is changed to revenue mileage. On one property the same bus is used in eight different operations in the same day with practically no non-revenue mileage.

Another plan which has made for greater economy in bus operation is a system of classifying and segregating the revenue and expense of various types of operation such as through load service, through express service and feeder bus service. Properties which do this are in a much better position to place their service where it will give the most satisfactory operating ratio.

One serious loss in connection with bus operation is the waste of gasoline and lubricating oils. On several properties individual records of gasoline and oil consumption are kept and reported to the general office monthly. Under this plan, any buses which show an extraordinary fuel consumption can be identified and the trouble corrected either by adjustments or a general overhaul of the motor. While most operators of large fleets have their own bulk storage for gasoline, it is not always possible to carry sufficient gasoline in the bus to take care of the day's requirements. One company was meeting this problem by having an arrangement with the various filling stations on its routes whereby the extra gasoline could be secured by the driver when required. This company found that there was a decided tendency for the amount of gasoline so purchased to increase with the result that it now operates its own tank truck which goes over a regular route each day and furnishes all necessary extra gasoline and oil.

One company has reduced the number of curve greasers required, by changing from oil to graphite. Another company reduced the itinerary of its curve greasers some 6,000 miles per year by working out a route which would give the least possible mileage. Several companies who formerly had their curve greasers walk about their division are now providing the men with light trucks, thereby permitting an increase in the territory per man and a reduction in the number of men. The use

of steam shovels for pulling out old rails in place of manual labor is cutting the cost of this operation on reconstruction jobs in several cities. One company has decreased the expense incident to the recovery of scrap by selling the scrap on the job instead of hauling it to a material yard. Elimination of delays and substantial reductions in overhead trolley maintenance have been obtained by making periodical inspections and renewals of trolley wire. Considerable saving has been made by reclaiming materials, using trouble crews for the purpose during the time they are not out on calls.

Considerable savings have been made through the use of machine methods such as automatic blacksmith hammers and electric welders. One company has designed and built a machine from old car parts for the purpose of bending rattan for sweepers, thereby reducing the labor cost in renewing sweeper brooms.

Some companies have increased their production by a rearrangement of their shops or by transferring work from one department to another. One company now has all of its air compressor cylinders and pistons fitted at its maintenance garage where special men and more accurate equipment is available. This change has reduced its air compressor oil consumption more than 16 per cent.

A system of individual car maintenance records has been used for several years on one property and has helped to keep down the maintenance expense by pointing out when a general overhauling of a car was necessary. This system also permits the mechanical department to advise the transportation department as to what cars should be used in full time service. Pull-in records have also reduced the number of road failures on several properties, thereby eliminating delays and the expense of moving crippled cars.

One property reports a saving realized from the use of sand spreaders on bus routes instead of chains on the buses. Not only is there a saving on the cost of the chains, but minor damage to bodies and fenders is prevented. The problem of keeping buses clean has been met on at least two properties by using a system of water sprays; one company reports that from 90 to 100 buses are cleaned every night.

B—THE USE OF ONE-MAN CARS

The use of one-man cars has been a subject constantly before this Association for many years. Each year marks the adoption of one-man service in places where it has been so often said, "it can't be done."

While the use of one-man cars can usually be justified on the basis of economic necessity, concurrently it has been shown in many places that frequency of service, at the same or better speed, better accident records and increased riding appeal, accompany the economy.

Reference should here be made to the 1928 Proceedings of the American Electric Railway Transportation and Traffic Association, pages 81, 82, wherein the committee on Service Betterment recommends "that the

operation of one-man cars be extended in the interest of service betterment."

This Committee has not made an independent census of the industry regarding this matter, but calls attention to the information contained in the American Electric Railway Association Bulletin No. 282, dated November 1, 1929

From this bulletin we find that of the 280 companies operating city service in the United States and Canada, which replied to the questionnaire of the Association, about 73 per cent or 204 companies are operating 100 per cent one-man cars during the base schedule and about 66 per cent or 184 companies are operating 100 per cent one-man cars including rush hours.

Attention is directed to the fact that the successful use of one-man cars is not limited to small properties. In the largest cities of the country there are many lines so operated. In several large cities, notably Kansas City, Buffalo and Newark one-man operation has reached 100 per cent of the total.

On interurban service in the United States and Canada of 103 companies which replied to the questionnaire, about 75 per cent or 75 companies are operating 100 per cent one-man cars in the base schedule and about 65 per cent or 67 companies are operating 100 per cent one-man cars including the rush hours.

In other words, of the total number of companies operating cars, which replied to the questionnaire, three-quarters were operating 100 per cent one-man operation in the base schedule and two-thirds were 100 per cent one-man operation all day long including the rush hour schedule.

The 1929 report of the Committee on The Equipment of the Transportation and Traffic Association, stated under "Acknowledged Tendencies in the Transportation Industry" the following. "2. Economic necessity indicated a continuing trend toward one-man operation."

Your Committee is of the opinion that the substitution of one-man cars for two-man cars has become more than a trend and that there are very few, if any, street car lines, except perhaps in the very largest cities, that cannot be successfully operated with one-man cars and we would strongly urge upon the industry a careful study of Bulletin No. 282 to the experience of various companies of the effect of one-man operation on their schedule speeds and accident records.

Wholly aside from the observation of economic necessity and the savings obtainable from one-man operation, your Committee suggests that this type of operation be considered more seriously from the service betterment standpoint. The public—your potential customer—is not to be interested in it because you are broke and must of necessity run one-man cars, nor is he especially interested in the reduction of accidents from your standpoint. It would appear better not to appeal to him on the basis of sympathy but on the basis of improved service.

C—SUBSTITUTION OF BUSES FOR STREET CARS

For the purpose of a study of the economics of bus substitution a transportation property may be divided in two parts: the road and the vehicle. The costs may also be divided in two parts: those involved in the construction and maintenance of the road, and those involved in the construction, maintenance and movement of the vehicle.

In highway transportation the road costs are paid by the government and the vehicle costs by the operator. In rail transportation both are paid by the operator. The economic theory of rail transportation is that the vehicle costs for moving a certain volume of traffic over a railroad are so much less than those for moving the same volume over a highway that the operator can pay the road costs involved in a railroad and still have a net saving. When it is proposed to substitute buses for street cars on economic grounds the extent to which vehicle costs will be increased, and the extent to which road costs will be decreased, must be ascertained for the particular line being considered. In order to estimate these changes in costs, the operating accounts must be analyzed with care.

Way and Structures is not entirely road expense. The item for removal of snow and ice will probably not be wholly eliminated by the substitution. The item for buildings, fixtures and grounds is largely vehicle expense, since many of the buildings are used for housing and repairing the rolling stock. But Way and Structures is mainly road expense, and most of it will be eliminated for a given line when buses are substituted.

Equipment is vehicle expense, except for a small part representing maintenance of service equipment used in roadway maintenance. The general experience seems to be that maintenance of equipment is higher for a given amount of service with buses than with street cars.

Power is vehicle expense, except for small amounts used in connection with roadway maintenance, etc. The corresponding account in connection with buses is Fuel, usually gasoline, oil, etc. Probably in most cases the cost of power per gross ton mile will be less in the case of street cars than in that of buses, but the lighter weight of buses, both per vehicle and per seat, will no doubt in many cases offset the higher cost per ton mile. This cost is affected by load factor in the case of street cars but not so much in the case of buses.

Conducting Transportation is vehicle expense. The principal item is wages of operators. If the same wage scales apply to both rail and bus operation, and if one-man buses are substituted for one-man cars—bus-for-car—this item will not ordinarily be changed. However, one-man cars as a rule are larger than one-man buses, so that while the substitution may involve no change in the number of units in service during the off-peak hours, it is likely to involve an increase in the number of units in service during the peak hours which, of course, will result in an increase in labor cost under bus operation.

In the final determination of this question of wages of operators it is,

of course, necessary to study working conditions as provided for under wage agreements and to ascertain the added costs, if any, that will result by reason of an increase in the number of units in service during peak hours.

Traffic is vehicle expense and should not be affected by the substitution.

General and Miscellaneous is partly road and partly vehicle expense, and different items are likely to be affected in different ways by the substitution. A considerable portion of this is fixed and therefore not affected whether operation is by car or bus. An important item is injuries and damages. This reflects the number and severity of accidents, and it is a moot question whether bus substitution will make matters better or worse in this regard

It is apparent that the operating accounts must be analyzed very much in detail if the effect of bus substitution is to be estimated with any accuracy. It is also necessary to know what service is to be given with the buses, in comparison with that given with street cars. A comparison between modern buses and old-fashioned street cars is not fair, so that if the cars being operated are not modern, an estimate should be made of what savings in operating cost can be made by the use of modern cars.

A most important consideration is the additional capital outlay required if, on the one hand, rail service is to be continued or, on the other hand, bus service is to be substituted, and the annual cost resulting from such additional investment in each case. These annual costs consist of return, depreciation and property taxes. Rail service requires the larger investment, hence return and taxes will be higher. However, rail property is longer lived than bus property, so depreciation may be higher for buses. A rail line involves both road and vehicle investment, a bus line only vehicle investment. It must be remembered that road investment previously made and abandoned in the substitution of bus service cannot be recovered unless this is done as a part of the charge for bus service. Therefore, if we are to include as a part of the cost to continue rail service an item to cover depreciation and return on the road investment, the cost of substituted bus service, to be strictly comparable, should include the cost of amortization of the road investment displaced, together with a carrying charge for the diminishing amount of road investment over the amortization period. If the road investment to be abandoned is disregarded, then in estimating changes in the return and depreciation items of cost only the prospective investment in connection with the continuation of rail service should be considered along with the prospective investment in connection with bus service. Removing road property will reduce the property tax. It may also reduce the rate-base, but in the case of many companies the return is now so far below a fair rate that a considerable reduction in the rate-base may be made without danger of regulatory action to reduce the income.

"Taxes" are in the case of the street railway partly a road cost and partly a vehicle cost. In the case of a bus line they are entirely a vehicle

cost, even though a part of the money may be devoted by government to road expense. We are here looking at the matter from the standpoint of the operator. In order to compare the tax cost of street car and bus service, the laws locally applicable must be considered.

The above discussion refers to gasoline buses, including gas-electric buses, since the latter represent simply a substitution of electric transmission for mechanical transmission between the engine and the driving wheels.

The trolley bus partakes of the characteristics of both rail and highway transportation, as distinguished above. In its case the operator pays that part of the road cost involved in the poles and wires, while government pays that part involved in the road surface. The operator, of course, pays the vehicle costs.

One company that has given considerable study to the economics of bus substitution sets up its studies of the problem as it affects an individual line under the following general headings:

- (1) Name of line for which bus substitution is considered
- (2) Present earnings per mile of route
- (3) Total route miles
- (4) Length of track immediately involved
- (5) Cost to put track in shape
 - (a) For long period
 - (b) For immediate requirements
- (6) Number of cars operated
- (7) Annual cost of present rail operation
- (8) Ultimate annual cost of rail operation
- (9) Capital outlay to continue rail operation
 - (a) Immediate
 - (b) Ultimate
- (10) Summary of rail operation
- (11) Number of buses required
- (12) Capital outlay for bus operation
- (13) Annual cost of bus operation
- (14) Estimated annual bus earnings
- (15) Summary of bus operation
- (16) Trend of rail earnings
- (17) Headway
 - (a) Rail
 - (b) Bus
- (18) Operating speeds
 - (a) Rail
 - (b) Bus

Another company that has likewise been called upon to give considerable thought to the matter of bus substitution, states that its procedure is first to analyze the present revenue from trolley operations and to consider the trend of earnings. New money requirements are then forecast. The next procedure is to draw up a complete operating statement for present trolley operations and also one for proposed bus operations, applying the same general principles as outlined in preceding paragraphs of this report. Where necessary the set-up is made to represent a forecast over a period of years, but usually the revenue trends

and a judgment of the future possibilities of the trolley and bus situation are sufficient

A sample summary of calculations resulting from this form of analysis is presented:

SUMMARY OF CALCULATIONS
ESTIMATES BASED ON TWELVE MONTHS PERIOD

<i>Item</i>	<i>Trolley operations continued</i>	<i>Trolley operations abandoned</i>	<i>Bus operations substituted</i>
Miles—			
Trolley	100,000	0	0
Bus	0	0	100,000
New money—10 years—			
Track	\$100,000	0	0
Paving	10,000	\$10,000	\$10,000
Equipment	30,000	0	27,000
Total	\$140,000	\$10,000	\$37,000
Total revenue—			
Trolleys	20,000	0	0
Buses	0	0	20,000
Total operating expenses—			
Trolleys	35,000	0	0
Buses	0	0	20,000
Operating income	\$15,000*	0	0
Special deductions—			
Interest on new money	\$11,200	\$800	\$2,960
Fixed expense of abandoned trolley	0	10,000	10,000
Operating income—net	\$26,200*	\$10,800*	\$12,960*
Marginal expense included above under "Operating Expenses"	\$25,000	0	\$20,000

* Deficit

A summary of this sort represents only one element to be considered in selecting the best means of transportation. Buses may coordinate with other lines better than trolleys. The present rail route may be such as to demand minor changes because of the nature of the territory served. The load factor, the prospects for future growth, the nature of the service desired may have determining effects one way or the other. Furthermore, if the line for which a substitution is being considered serves an industrial district the relation of the present employment index to that which may be expected over a future period must be given consideration. All these and others are matters to be carefully weighed in determining whether to substitute bus for rail service. Any one may far outweigh as an influencing factor the results indicated from an analysis of operating costs, but these are more or less definite and reveal what the effect on the net operating income is likely to be if buses are substituted. Therefore, a detailed analysis of this character is necessary for consideration along with other factors.

Thus it does not appear that there is any simple formula by which the relative economy of street cars, gasoline buses, or trolley buses can be determined for any given case, but all relevant factors must be carefully analyzed. In many cases the final decision will be influenced by factors not discussed above.

D—BUSINESS GETTING

Should the advertising methods used in other lines of business be applied by street railways to increase their business?

This was one of the matters suggested for study by this Committee. To pursue the subject seemed to be covering ground already covered by former committees on Merchandising Transportation, Service Betterment, Advertising, The Passenger, etc

Recognizing, however, the rapidly changing conditions that confront all industry, and the changing viewpoints which are either responsible for, or the result of, such economic readjustment, it was felt desirable and necessary that an expression be secured from the industry on the basic fundamentals of business promotion.

In order to develop the extent to which aggressive merchandising methods are now being employed, as well as to gain the benefit of the reaction of company executives, a questionnaire letter was directed to representative companies in all sections of the country. It is not considered necessary to present here all the views expressed.

That there was some divergence of opinion is not surprising but there was a very decided declaration made by many of the companies that a high quality of service must be maintained before results can be obtained from advertising. As one reply expressed it, "many of us have a great deal to do before advertising can be justified. A company with poor transportation facilities would injure itself by extensive advertising, and while excellent transportation facilities to a great extent advertise themselves, additional advertising would be very beneficial."

It may fairly be taken as a conclusion that a prerequisite to any lasting benefits from advertising is excellence of the product. The customer is not interested in loss, cost and waste.

It is not within the scope of this Committee to suggest the national or local advertising of street railway or bus service. Such expressions as we have quoted above are not new but are contained in the past reports of committees on Merchandising Transportation, Advertising, etc. to which attention is directed. Perhaps the studies now being made by the committee on The Passenger will develop something new through the market analysis.

Your Committee is grateful to those who cooperated in the limited investigation undertaken but it appears inadvisable to do more than suggest that if this matter is to be pursued further, it should be done by a separate committee. We believe some thought should be given the opinion expressed in one of the replies to our questionnaire: "We can say that we do not know of any other business that does not make use of every proven successful advertising and selling method to increase its business and earnings. In fact, we don't know of any successful business of any kind that is not actuated by the commercial spirit and making an effort to sell its product. If the proper form of advertising is not worth while in the street railway business, then it is the only business in the world that we know of in which it is not of value."

E—FARES

Foregoing sections of this report have dealt with ways of decreasing the expense of operation and with means of stimulating traffic, both with the aim of increasing net income.

After the possibilities of these measures have been exhausted, and further relief is found necessary, the only other recourse is to an increase in the rate of fare or a change in the fare structure to increase the revenue.

Many companies have met this problem and it is the belief of your Committee that the industry as a whole will benefit if the experience of such companies is analyzed, studied and presented in some detail, with respect to the amount of such increases, the effect on the number of revenue passengers carried, and the net increase realized.

Such a study would require the gathering of a considerable amount of statistical data from a representative group of companies.

In the limited time available this year it has not been possible to make a study of this nature. The work has been confined to an examination of the trend in revenue passengers in eight cities of the United States, each with over 500,000 population, from 1926 to and including 1929. The results are shown in the form of a graph. (Fig. 1.)

The drawing of deductions from such a limited study should be reluctantly undertaken. It is well known that there are many variables affecting the number of revenue passengers carried other than the rate of fare or fare changes.

Fig. 1 consists of a series of curves constructed by plotting index numbers representing the total revenue passengers carried in moving 12 months periods, the number carried in 1926 being taken as 100. The cities have been designated A to H inclusive.

With the exception of city G, none of the cities included had any fare changes in 1926. City G had a fare increase in October of 1926, which may account for the departure of its curve in 1927 from the general trend shown by C, F and E.

Cities A, D and E had fare increases during the period reviewed. The rates of fare in the remaining cities were unchanged.

The general characteristics of the curves for cities A and D after increase A₁ and D₁ are quite similar. It would appear that these fare changes caused rather a definite number of former riders to permanently seek other means of transportation, although the rate of loss is somewhat greater during the first few months after the change in rate, than for the remainder of the year cycle. After 12 months the trend of these curves is not dissimilar to that of companies having no increase.

It is interesting to note that increase D₂ had relatively small effect on D curve, nor did D₃ (which became effective early in the month) make any immediate change in the trend.

City H traffic shows the influence of local industrial conditions in a pronounced fashion. The drop in the curve in 1927 and its improve-

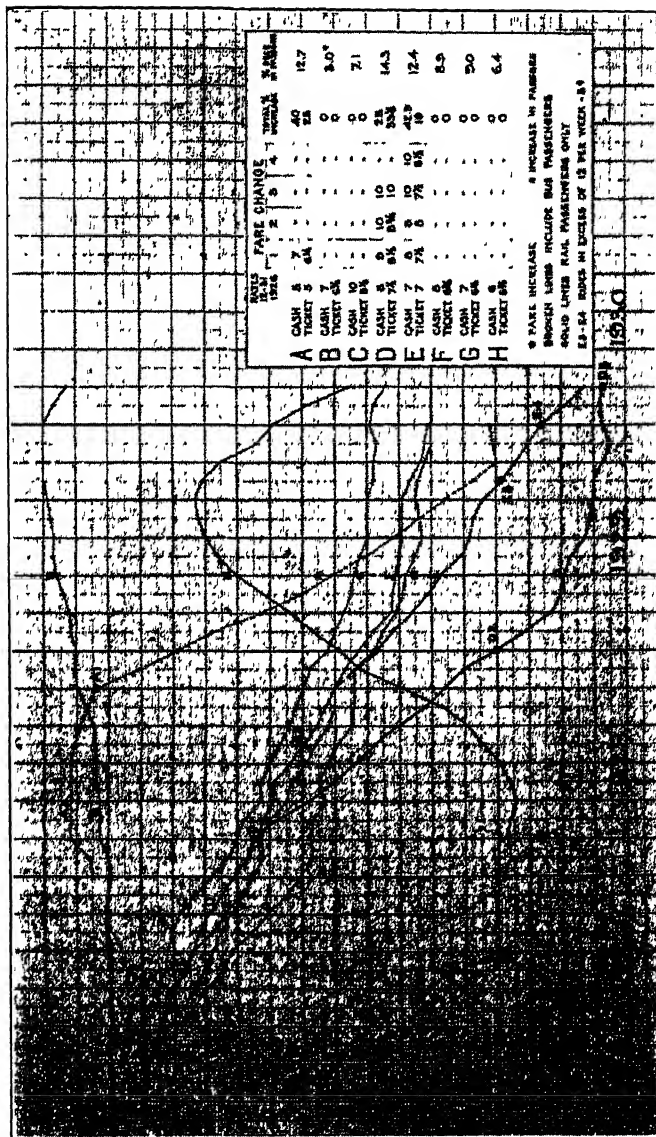


FIG. 1—INDEX NUMBERS—REVENUE PASSENGERS—12 MONTH MOVING TOTALS—8 CITIES WITH POPULATION OVER 500,000. YEAR 1926=100.

ment in 1928 and 1929 coincide with industrial activities in the city, and the business depression beginning in October 1929 is also quickly reflected.

City B is fortunate in showing rather consistent increases in traffic for practically the whole period.

The curves for cities C, F and G are generally similar in trend. These cities had no fare changes during the years covered by the graph.

As stated before, it is the belief of your Committee that the study presented is entirely too limited to be other than suggestive of possible benefits that might accrue to member companies if the subject were pursued. A more detailed study should include a number of other properties showing not only the effect on passengers but also the effect on revenues. If this Committee is continued, this will be done for the next report.

Any change in the fare structure may not be lightly measured or assumed. Changes other than blanket increases such as applications of the pass or adaptations of the zone system or a combination of the two, may have widely varying effects upon the different classes of riders. It would seem that some study of this phase of the matter should be made.

It has been suggested by one of our members that a study of the number of riders and the frequency of their use of the service is an important element. Such a study would show, for example, what number of riders would actually cut their car riding cost by the use of a weekly pass and how much would have to be made up on other riders to compensate for this loss before the company could show an increase in revenues. Similarly, the effect of other fare structures could be anticipated.

The collection of the basic data for such a study seems to be an obstacle at this time but this may be worked out satisfactorily. We have not made an actual investigation that would develop any data under this heading but a graph, Fig. 2, is presented indicating characteristics which may be found on a typical property.

Until data of this nature is available, any company is handicapped in attempting to construct a fare schedule that will have the proper appeal to all classes of its business and one that will produce the desired reaction by all classes of riders at the fare box. We offer this matter as a subject for further research.

Assignments to this committee included the coordination of border line topics between committees and the study of those matters not fully covered by any one committee. Even had this not been a short association year, it would not be possible at the beginning of this committee work to have developed this phase of the assignment. But some instances of what this Committee may so consider, were found under these adverse circumstances and by action of the executive committee, certain border line topics of other committees have been transferred to this section of this report—due credit being given. The following is taken from the work of the Committee on The Equipment.

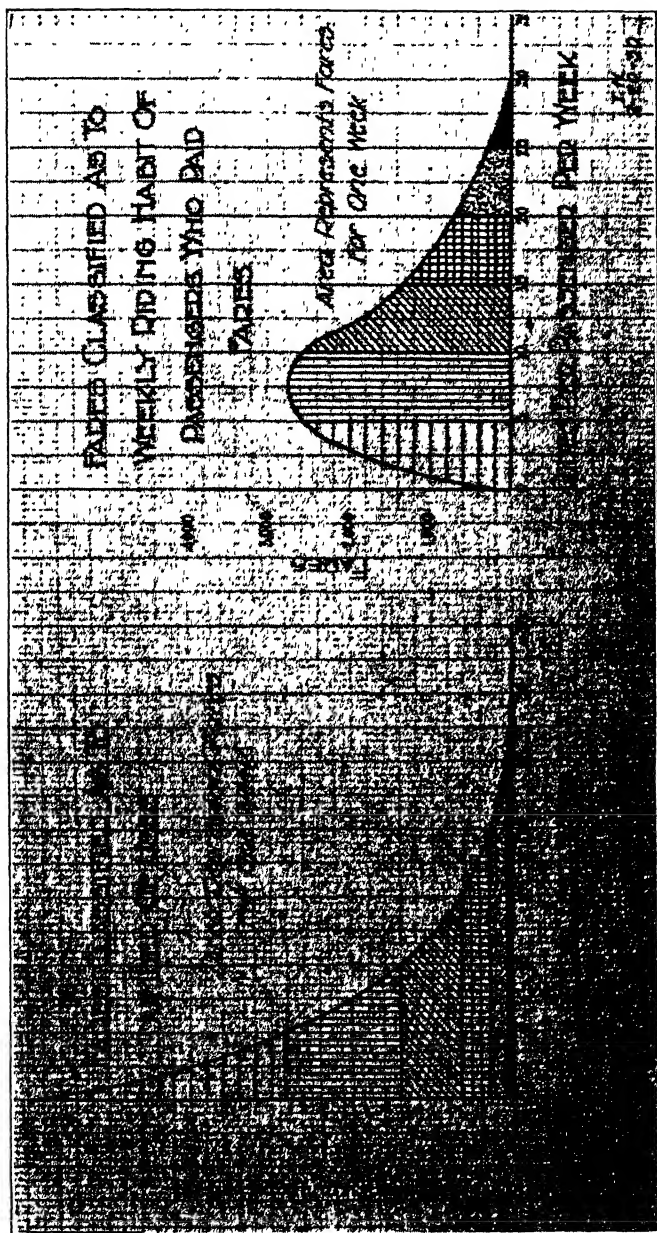


FIG 2—GRAPHIC REPRESENTATION OF ASSUMED DATA ON PASSENGER RIDING SHOWING RELATION BETWEEN RIDES PER WEEK CLASSIFIED AS TO USERS AND AS TO RIDING HABIT PER USER.

Cooperation with the Accountants' Association in further developing a system of cost keeping analysis by lines.

The value to bus and electric railway operators of making a periodic analysis of net operating results by routes and classes of service has been indicated by previous reports of the committee on The Equipment. General recommendations as to the method of securing such information were made in these reports with the view to producing the most accurate information for the least expense.

It is only by analysis of detailed operating performances that the transportation men of a company can determine whether their practices are economical. With this idea the accountants are in sympathy.

Such important facts, for instance, as the effects of new equipment, involving costs running at times into millions of dollars cannot be reliably determined except when costs are segregated by types and groups of equipment, and revenue and costs are analyzed by routes or lines. The need for the prompt application of such proven business methods to our industry is essential in helping to solve the many pressing problems now confronting us.

The Committee recognizes the fact that a statement of operating revenues and expenses by routes need be only exact enough to show the trends of results of existing practices. The value of such a periodic study is commensurate with the extra cost of securing the information. The data, once prepared, becomes of particular value for comparative purposes in case changes in schedules, fares, equipment, or traffic occur.

The Accountants' Association agrees that the methods suggested by this Committee, i. e., securing direct costs for major items of operating expense, and reasonable bases for proration of other items will produce the best results.

The Committee is of the opinion that a universal method can be developed that will have a ready application to any and all properties. Some modification in method may be due to the various local physical, accounting and operating differences found among bus and electric railway operating companies. In general, however, the universal method will be found applicable.

Specifically, the joint conclusions of this Committee with the Accountants' Association are:

(1) That a periodic (preferably monthly) analysis of operating results of street car and bus operation, in urban, suburban, and interurban service, is practicable and of considerable value to the management in determining the earning power of the various operating units (whether routes, division, or classes of service).

(2) That this analysis need not be, and cannot be, 100 per cent exact, but rather will serve to indicate accurate results. In most

instances, operating revenues can be readily segregated to routes, but in determining operating expenses for the same routes, the need for approximations becomes more apparent. The considerable detail required, and expense involved, in reporting all expenses by individual routes and classes of service makes an exact analysis prohibitive.

(3) That, generally, transportation service may be broken down first, to three classes—(a) passenger, (b) freight and (c) other (to include switching and interurban rail lines, operation of locomotives, service cars, etc.) and the passenger service may be further broken down to operating units or routes.

(4) To each of these classes of service may be charged certain expenses of operation which may be determined directly. Certain of these principal items of operating expense may be prorated fairly accurately, using units of measurement which most correctly reflect variations in that operating expense.

Finally, certain items of general and supervisory expense will necessarily have to be prorated on an arbitrary but reasonable basis.

(5) That an analysis of this sort should exclude items of non-operating income and expense, that it may have greater value for comparative purposes.

(6) That the suggested formulae appended to this report, Appendixes A and B, be utilized in determining a method of analysis for the individual property, making direct charges wherever possible.

With many operators the analysis of data indicating route costs has been in the nature of an experiment. Some have passed from the experimental state, and the "Monthly Statement of Operating Revenues and Expenses by Routes" finds a place of prominence, and justly so, on the desk of the managing head. Among the operating companies who have found these regular analyses to be of sufficient value to warrant their continuation are: The So. Carolina Power Co., Charleston, S. C.; Baltimore Coach Co., Baltimore, Md.; Monongahela Transportation Co., Fairmont, W. Va.; Virginia Power Co., Norfolk, Va.; Blue Ridge Transportation Co., Hagerstown, Md.; Coast Cities Ry. Co., Allenhurst, N. J.; Georgia Power Co., Macon Division, Macon, Ga.

This Committee believes that it cannot hope to function further than in suggesting methods for the preparation of these analyses, with the urgent recommendation that consideration be given to the more complete study of the operating results of each unit of the transportation system.

The discussion, charts and data in the report of the Committee on The Movement of the Vehicle under the heading "The Private Automobile," are vital to that Committee's work but enter into this problem of operating economics as well. Since that section could not be lifted, it is included here by reference only.

In conclusion we recommend that this Committee be continued for another year and that a more definite assignment of subjects be given. It is anticipated that in the future its reports will take on more the nature of that section of this report dealing with the substitution of buses for rail cars, wherein more definite economic factors may be developed.

Respectfully submitted,

WM. B. BENNETT,
J. P. W. BROWN,
C. F. CRANE,
HORACE FLIGG,
C. H. FORSGARD,
T. G. HAMILTON,
J. E. HEBERLE,
A. M. HILL,
R. B. HILL,
THOMAS HOOKER,
F. H. MILLER,
H. G. MORRIS,
E. MURPHY,
C. D. PORTER,
DEL A. SMITH,
A. C. SPURR,
J. P. TRETTON,
EDWARD A. WEST,
H. R. WHITNEY,
JOE R. ONG, *Chairman*,
C. H. EVENSON, *Sponsor*,
PAUL E. WILSON, *Sponsor*,

Committee on Operating Economics.

APPENDIX A

A PROPOSED METHOD OF DISTRIBUTION OF COST TO ROUTES AND CLASSES OF BUS SERVICE

ACCOUNT	METHOD OF DISTRIBUTION
I Transportation Revenues	
1201 Passenger revenue	Direct
1202 Baggage revenue	Direct
1203 Special bus revenue	Direct
1204 U. S. mail revenue	Direct
1205 } Other miscel. transp. revenues.	Bus
1206 }	

II Miscellaneous operating revenues

1210 Station and bus privileges	Bus
1211 Parcel room receipts	Bus
1213 Rent of equipment	Bus
1214 Other operating revenue	Bus

OPERATING EXPENSE ACCOUNTS

I Maintenance Plant and Equipment

1301 Superintendence	Operating bus hours
1302 Maintenance dept. rents *	Bus
1303 Maintenance Bldgs., fixtures and grounds	Bus
1304 Maintenance bus bodies	Operating bus hours
1305 Maintenance bus chassis	Operating bus hours
1306 Tires and tubes	Bus Mile
1308 Maintenance shop and garage equipment	Operating bus hours
1309 Maintenance and Operation Service car equipment	Operating bus hours
1310 Miscel. shop expense	Operating bus hours
1311 Retirement expense	Buses **

II Operating garage expenses

1315 Fuel for revenue vehicles	Bus Mile
1316 Lubricants for revenue vehicles	Bus Mile
1317 Garage employees	Bus
1318 Garage supplies and expenses	Bus

III Transportation

1320 Superintendence	Operating bus hours
1321 Bus drivers and conductors	Man-hours
1323 Transportation rents	Direct
1324 Station expenses	Bus
1326 Freight and baggage damage	Direct
1327 Road Expense	Direct
1328 Other transp. expenses	Operating bus hours

IV Traffic

1330 Superintendence and solicitation	Operating bus hours
1331 Advertising	Operating bus hours
1332 Traffic rents	Operating bus hours
1333 Miscellaneous traffic expenses	Operating bus hours

* This account is under consideration by the committee on Bus Accounting with a view to making rents a deduction from income, in order that comparisons may be made between companies that own and those that rent garage facilities.

** "Bus" or "Bus Mile" optional, depending upon method of setting up retirement reserve.

V Administrative and General expenses

A—Administrative

1334 General officers; salaries and exp.	Operating bus hours
1335 General office clerks; salaries and exp.	Operating bus hours
1336 General office exp.	Operating bus hours
1337 General law exp.	Operating bus hours
1338 Administrative supplies & exp.	Operating bus hours

B—Other general expenses

1341 Employees Welfare	Bus
1342 Valuation exp.	Bus
1343 Regulatory commission exp.	Bus
1344 Amortization of Licenses, franchises	Bus
1345 Injuries and damages	Direct percentage of revenue)
1346 Insurance	Bus or gross revenue
1347 Storeroom labor and exp.	Operating bus hours
1348 Franchise requirements	Direct
1349 Joint operating exp. transferred credit	Direct
1350 Rent of rolling stock	Bus
1351 Other general exp.	Operating bus hours
1405 Taxes:	
Federal, Capital stock	Bus
State, city, county	Bus
Seat mile	Direct
Gasoline	Bus mile

APPENDIX B

A PROPOSED METHOD OF DISTRIBUTION OF REVENUES AND EXPENSES
TO ROUTES AND CLASSES OF ELECTRIC RAILWAY SERVICE

ACCOUNT

I Transportation Revenues

101 Passenger Revenue

METHOD OF DISTRIBUTION

Cash Revenues—direct.

Pass sales—On basis of traffic checks, or in same ratio as cash revenue.

Transfers—Alternatives

(1) Average fare per passenger times the number of passengers on route, or

(2) Disregard transfers entirely.

Free Transportation—To be handled arbitrarily.

Revenue on Shuttle Lines—To be pooled with trunk line served. Exceptions to be handled arbitrarily.

102 Baggage Review	Direct, when handled on passenger cars.
103 Special Car Revenue	Direct.
104 Mail Revenue	To be handled separately or distributed to routes depending upon the portion that revenue from these sources is of the total volume of business.
105 Express Revenue	
106 Milk Revenue	
107 Freight Revenue	
108 Switching Revenue	
110-119 Revenue from rail operations	To be handled arbitrarily.

OPERATING EXPENSES

Way and Structures	City Routes—Car Mile—Inter-urban Routes—Track Mile
1-24	
25 Depreciation on W. and S. Equipment	All Routes—Track Mile
29-44	
Power	Operating Car Hours
47-62	
Conducting Transportation	Operating Car Hours
63-78	
Traffic	
79-82	Gross Revenue

General and Miscellaneous

83. Salaries and expenses, gen. officers	Gross Revenue
84. Salaries and expenses, gen. office clerks	
85. Gen. office supplies and expenses	
86. Law expenses	
87. Relief Department expenses	
88. Pensions and gratuities	
89. Miscellaneous general expenses	
90. Valuation expenses	
91. Amortization of franchises	
92. Injuries and damages	
93. Insurance	Direct
94. Stationery and printing	
95. Store expenses	
96. Garage and stable expenses	
97. Rent of track and facilities	
98. Rent of equipment	
99. Other operations—Dr.	
100. Other operations—Cr.	

Taxes

Federal, Local, Property	Track Mile
Gross Sales	Gross Revenue

CHAIRMAN WILSON:—The secretary will read a letter of comment from Mr. Ong to President Riddle, relative to the last phase of the report.

[Mr. F. C. J. Dell then read the letter as follows:]

MR. SAMUEL RIDDLE, *President, American Electric Railway T. & T. Ass'n., Fairmont Hotel, San Francisco, Cal.*

DEAR MR. RIDDLE.—I regret that it is impossible for me to come to the convention this year. Naturally I am very greatly interested in the work of the committee on Operating Economics and I did want to hear the discussion of the report and perhaps add some comments myself.

The first page of our report attempts to summarize very briefly the contents of the report and for one who cares to go into greater detail on any one of the subjects, that part of the report may be read in full. We have endeavored to express ourselves in a way that would be understood so that I believe the report speaks for itself.

There is, however, one matter upon which I wish to make further comment. Unfortunately I was not able to attend the meeting of the Executive Committee when it was decided to transfer from The Equipment committee report, certain tables and recommendations which it was thought might have been included in the assignment of the committee on Operating Economics, if it had been possible to organize the committee work along normal lines in a short year.

I refer specifically to Appendix A entitled "A Proposed Method of Distribution of Costs to Routes and Classes of Bus Service" and Appendix B entitled, "A Proposed Method of Distribution of Revenues and Expenses to Routes and Classes of Electric Railway Service."

The general objection I have to the proposals made by The Equipment committee included in this report and which might appear as a recommendation of the committee on Operating Economics, relate especially to the use of operating bus hour for certain items where I think it would be much better to use the bus mile and in Appendix B I think they have used operating car hour where the use of car mile would be preferable.

Take for example, accounts 1304, 1305, 1308, 1309 and 1310. It seems to me that these expense items vary according to the bus mile rather than to the bus hour. To take an extreme case, we might compare one line where the layover was very small and the speed very high on which we might have 15 or 20 miles and one bus hour, while on a feeder line where the bus was operated merely to make connections, we might have seven or eight bus miles in one bus hour. It seems to me much more reasonable to assume that such maintenance cost items will vary rather with the use of the bus measured by bus miles and not according to bus hours.

It may be noted that fuel and lubricants for revenue vehicles are distributed according to the bus mile and to show the inconsistency of

the committee's recommendation, I mention this and ask you to compare it with their recommendation on the distribution of power cost on rail cars which will appear in the discussion in Appendix B.

I am perfectly willing to concede that there are certain items upon which the bus hour unit is the proper basis for distribution, for example Superintendence of transportation and other transportation expenses, and I think the committee is right in distributing account 1321, Bus drivers and conductors, on the man hour basis.

I do not think the division under the fourth classification, Traffic, makes very much difference and I find no fault with their recommendation in this regard.

There might be some question whether the administrative expense should be on a bus mile or bus hour basis, but I do not think it would make a great deal of difference. I rather feel that classification 1347, Store room labor and expense, should be on the operating bus mile for the same reason that the maintenance expense should be on the bus mile basis.

Referring to Appendix B' and the recommendation for the distribution of operating expenses, I take particular exception to the distribution of equipment expense accounts 29 to 44, and the power expense accounts 47 to 62, on an operating car hour basis. I do not believe the equipment maintenance has anything to do with car hours, except possibly the burning of lamps and weathering of paint on the outside of the car if they have outdoor storage and I am not so sure that this has any bearing; and I am not so sure but what the car mile basis would be better for that item. We do not have to replace brake shoes or rewind armatures or overhaul our trucks because of the number of car hours these cars have been on the road, but because of the number of car miles they have been operated.

The distribution of power expense certainly ought to be on the car mile basis except for the small amount of power that would be used for lighting. This is comparatively insignificant. The Equipment committee thinks that the fuel and lubricants for the buses should be distributed on the bus mile basis and it is rather difficult to say why the power on rail lines should be distributed on the car hour basis.

I must admit that it would be much more satisfactory if I could hear the discussion on the other side of this question as I do not know what led the committee to their conclusions. However, I feel that they have overemphasized the car hour unit as the basis of distribution of costs, and I do not wish it to appear that these are the recommendations of the committee on Operating Economics.

Very truly yours,

JOE R. ONG, *Chairman,*
Committee on Operating Economics.

CHAIRMAN WILSON :—It is to be regretted that neither Mr. Ong nor Mr. Hughes, who are particularly responsible for this section of the report on cooperation with the Accountants' Association to the end that a uniform system of cost analysis may be developed, could be here; but I trust that any of you who are interested in this phase of the report will not hesitate to let us have your views.

Mr. Van Auken, have you prepared a discussion?

[Mr. Van Auken read his prepared discussion as follows:]

DISCUSSION OF REPORT OF COMMITTEE ON OPERATING ECONOMICS

BY CLAUDE L. VAN AUKEN, *Vice-President and Managing Editor,*
"ELECTRIC TRACTION," CHICAGO, ILLINOIS

To me, the outstanding general thought which this report leaves with the reader is the impression that in the past we in the electric railway industry have proceeded too much on guess work and not enough on analytical analyses and scientific bases.

One of the concluding paragraphs of the report sums up this thought as follows: "With many operators the analysis of data indicating route costs has been in the nature of an experiment. Some have passed from the experimental state, and the 'Monthly Statement of Operating Revenues and Expenses by Routes' finds a place of prominence, and justly so, on the desk of the managing head."

The report also emphasizes the preparation of such analyses and urgently recommends that consideration be given to the more complete study of the operating results of each unit of the transportation system.

In other words it seems that perhaps many additional economies may be introduced by a more thorough system of analysis. Research has played too small a part in the coordinated activities of member companies and well directed efforts along this line would certainly prove of practical value in promoting economies of car operation.

It seems that no one in the industry can talk on the subject of operating economies without discussing or at least mentioning its twin, increased revenues. Running true to form the committee's report deals with this subject. In this connection intensive study and research should also prove advantageous. There is a crying need for scientific fare structures on a great many of our properties. It has been sufficiently demonstrated that fares may be too high as well as too low. Talking in recent months with managers of systems for cities listed in the census among the fifteen largest, conjecture has been expressed in two cases, one east and one west, as to whether it may not be a fact that a downward revision of fares might bring increased total revenue. In another instance it has been suggested that a 10 cent fare during rush hours

and a five cent fare at other times might be a possible solution to the fare problem. This method is used very successfully by movie houses, theatres, bootblacks, etc. The situations mentioned merely emphasize the need for a scientific fare structure.

There never was a time in the history of the industry when the situation called for more intensive study, analysis and research. The committee on Operating Economics has specifically pointed out certain analyses that should be made and utilized and further recommends that additional definite assignment of subjects be given to the committee for next year. An excellent start has been made. Analysis and research work should be continued and expanded to other committees and the affiliated associations.

CHAIRMAN WILSON:—I am going to ask Mr. Carl Stocks, who has observed operations from the Atlantic to the Pacific, especially by bus, because that is the way he came out, if he will give us the benefit of his views.

C. W. STOCKS:—I did not come in here with the idea of making a speech, but inasmuch as Mr. Wilson has called upon me to give a few impressions of the trip I made from New York to San Francisco by bus, I will say that of the 3400 miles of bus route between the two cities there was not one of them that did not have a payload on the bus. I traveled with ten different companies, spent two nights in a chair car, one night in a sleeper, without a flat tire and without a miss on a spark plug. There was one coach that didn't function very well in first gear, but after the vehicle was moving and had been shifted into high it was all right. I rode on buses that were put out to travel 800 miles, needing nothing but greasing every 200 miles, and replenishing the oil reservoir and the gasoline tank.

The success that these long distance bus companies have been able to attain, both in maintenance and building of traffic, opened my eyes to the possibilities of what might be carried on still further in connection with long distance bus operation.

Of course there are drawbacks to the trip. It was not like traveling in a Pullman car, neither are the meals that you pick up en route like those you can buy on a Pullman car. I ate many sandwiches, and drank a lot of poor coffee. Outstanding, however, of the things that I found en route, was the lack of what might be called good service and comfort stations.

We who have been in the transportation game a long time, after having seen large companies develop into larger corporations moving a large volume of business, don't like these things. They sound bad and I agree with you that they are bad. But let me say that some of the present bus companies have gone so far as to consider the establishment of separate companies that will install roadside facilities, first, for the convenience of their patrons and, second, to let the other highway travelers help support the load.

So far as the vehicles are concerned, I rode in about everything built including one of those buses that the California companies built themselves, along their own ideas—to handle the traffic over the routes which they were serving in the hilly country. It was a remarkable performance of a lightweight bus with a big engine, an engine with the horsepower per pound of weight considerably less than some of the bigger buses today.

We made the 3400 miles without any difficulty. Schedules were not more than one hour late in any instance. The trip did, in some instances, call for a twelve hour stop coming in on one company and going out on another. In that way I had a chance to get caught up a little on my sleep, get a bath, and get my clothes cleaned, because the roads, especially through Kansas, where they are not oiled, are pretty dusty. Let me say that I used the National road entirely in coming out here and simply picked the bus companies that were operating over that pike.

I was surprised at the work that the state highway departments of Pennsylvania and California are doing on the mountain roads. In Pennsylvania they used to have a lot of sharp grades and mean curves, but they are cutting them down, making cuts as much as 60 to 65 feet, smoothing out the curves and grades, so that it will be almost possible to go down the mountains, in a straight line, but on an easy grade of 7 per cent or 8 per cent. The same thing is being done in the mountains in Nevada where the road goes up over the top of the world; that is also being straightened out.

J. L. ALEXANDER:—How long did the trip take?

C. W. STOCKS:—I started from New York at 1 o'clock Friday and reached San Francisco Saturday at 7 o'clock at

night—about 180 hours elapsed time. That could be still further reduced. I think the fastest time, if you want to go on a bus by continuous riding night and day, is about five and a half days.

ACTING SECRETARY DELL:—How many passengers came all the way through with you?

C. W. STOCKS:—None. For this reason: I did not start out from New York on a through company and did not stick to one company all the way. For instance—you might be interested in the names of the lines I traveled on—I started from New York to Baltimore on the Nevin Bus line; from Baltimore to Washington, Pennsylvania, via the Blue Ridge Transportation Company; from Washington to Wheeling with the White Star Company; from Wheeling to Columbus with the Red Star lines; from Columbus to Indianapolis with the Colonial Stages; from Indianapolis to St. Louis and from St. Louis to Kansas City on the Greyhound lines, and rode a sleeper—the night coach. Most of you gentlemen have seen them. From Kansas City to Denver I went over the Pickwick-Greyhound line; from Denver to Salt Lake City over the Interstate Stage Lines, or the Union Pacific stages; and from Salt Lake City to San Francisco over the Pacific Greyhound Line.

The fare that I paid was a little over \$80.00. The through fare, straight through on the Greyhound System, is \$74.00.

CHAIRMAN WILSON:—Mr. Jordan will now discuss the report.

[Mr. Jordan then read his prepared discussion as follows:]

DISCUSSION OF THE REPORT OF THE COMMITTEE ON OPERATING ECONOMICS

By H. E. JORDAN,
Superintendent of Car Equipment, LOS ANGELES RAILWAY CORPORATION,
LOS ANGELES, CALIFORNIA

I would like to attempt to enlarge on that part of the report of the committee on "Operating Economics" under the heading of "Cooperation With the Accountants' Association in Further Developing a System of Cost Keeping Analysis by Lines."

In the conclusion of the report under this heading the committee made the following statement: "A system of analyzing operating costs

by routes is essential to intelligent operation." A more true and significant statement could not have been made. Cost accounting might be correctly termed the "eyes" of any business, as it is the approved method of modern business for picturing the economics of a business.

A complete and efficient cost accounting system will show the engineering and mechanical departments their weak and expensive equipment, and will permit them to definitely know when it is more economical to replace equipment, from a maintenance standpoint, than to continue its operation. It will show the operating department the net difference between the revenue and operating expenses of each line, and will permit them to easily detect superfluous and inadequate service. Then when these department heads submit their analysis and reports to the management for replacement and additional equipment, or alteration in the service of a line, the data are based upon cold, hard facts and not the uncertain figures derived from approximating, guessing and estimating, which is necessary when a cost accounting system is lacking or incomplete.

In electric railway groups we often hear the cautioning phrase, "Be careful or your cost accounting will become top heavy." It may be truthfully said, there is no large industry today that is more lacking in adequate cost accounting methods than the electric railways, and this fact is the greatest handicap under which they operate today.

If the demand is sufficiently great for the product that a business produces, the business may be operated profitably without keeping cost records, but it will certainly not operate efficiently. Whenever competition enters a business field, only the efficient producer survives.

The electric railways operated for many years without any appreciable competition and when there was a great demand for power transportation, but we all know the gas engine in the automobile, the motor coach, and the motor truck has become an aggressive and a severe competitor in the transportation business.

It may not be entirely fair to say that the street railway industry is the outstanding example of what a monopoly will do for a business, but the evidence is very convincing that something has been terribly wrong with the industry, which during the short period of twelve years, allowed itself to be so completely ravished by competitors, namely, the automobile and motor truck. This is especially true when we consider that with the sole exception of competition, all other conditions such as the rapid growth and centralization of industrial and commercial centers removed from residential centers in the cities, which make such ideal conditions for mass transportation, were so favorable to the healthy growth and development of the industry.

Street railways manufacture and retail products in just as true a sense as any industrial concern manufactures and sells its products.

The industrial manufacturer makes an article. It takes so much labor, so much material, so much wear and tear on their shop machin-

ery, office routine, advertising and selling expenses. The manufacturer must add all of these costs together and then add an additional sum, namely, his profit. The cost and profit have to be very accurately calculated, because the large majority of the big selling industrial products have many manufacturing competitors, all offering their product to the same market, and unless they operate efficiently their producing costs will approach and exceed the market price set by other manufacturers.

It is a fact that the more thriving and larger a manufacturer is, the more systematic and accurate are his record and cost systems. He continually analyzes his costs because whenever he can reduce his costs he either increases his margin of profit, or he can reduce his price below his competitors and thereby increase his volume of business.

It is true, that a federal or civic body does not fix the selling price of a flat iron, a suit of clothes, or an automobile, but the competition in the open market does fix the selling price, and competition is a heartless, domineering "price fixer," that is, a very erratic and unreasonable captain which must be constantly watched and whose commands must be followed promptly if the sale of the product is to thrive.

If the manufacturer makes two or more products such that the sale of one does not depend upon the sale of the other, it is obvious that he must keep the manufacturing cost of each article separate. If he does not, the selling price of each of the two articles cannot be accurately determined, and the margin of profit made by one article may be entirely consumed by the excessive cost of the other.

When the manufacturer finds that he cannot make a profit on a particular article, he immediately starts to make changes in the article itself, its production cost, or the price so that he does make a profit, or else he abandons the production of it as quickly as possible.

Although a street railway company's products may have one common name, namely, the "car ride," and they may have one price, namely, the "car fare rate" fixed by a governing state body, yet there is a decided difference in the manufacturing costs of one "car ride" over that of another, and since the selling price of the "car ride" is fixed, the "car ride" manufacturer must regulate his margin of profit by changing the cost of the "car ride." To do this intelligently it is absolutely essential that he have accurate and detail cost accounting data at hand.

If the product called a "car ride" has a fixed selling price and a company decides to manufacture and market it for the purpose of making money, that company must start with a selling price as the basis and by figuring backward arrive at that manufacturing cost sufficiently below the selling price to permit a fair margin of profit to be made.

It is not intended herein to suggest that each individual "car ride" be operated at a profit, or its operating costs calculated, any more than it would be suggested that the manufacturer calculate the cost of and make a profit on the first article he manufactures after setting up his machinery for a large production of those articles. However, if it is

desirable and necessary for the industrial manufacturer to know what it costs to manufacture each type of product that he makes in order to be assured of making a profit on them, it is just as desirable and necessary for a street railway company to know what it costs to manufacture each of its different types of products, namely, the cost of manufacturing, or producing a "car ride" by lines.

CHAIRMAN WILSON :—We will call on Mr. Turley now to discuss the report.

[Mr. Turley read his prepared discussion as follows:]

DISCUSSION OF THE REPORT OF THE COMMITTEE ON OPERATING ECONOMICS

BY L. J. TURLEY,

Electrical Engineer, LOS ANGELES RAILWAY CORPORATION,
LOS ANGELES, CALIFORNIA

The scope of this subject is so broad, involving as it does the various elements of railway engineering and operating methods, practices, and executive policies, that I wonder at this committee attempting any other course than one of just touching upon the generalities of this assignment. Doubtless, other committees, in both the Transportation and Engineering Associations, have been delegated with specific phases of this most important subject for greater detail.

I have read this report with considerable interest. It contains nothing to suggest economies that would create a low standard of maintenance nor poor, ill-kept equipment. It offers encouragement to those who are attempting rehabilitation of the old and purchase of the new. It includes sufficient facts and remedies to meet the solution of nearly every operating company's problems. It awakens the industry against fixed, "old foggy" ideas of the last decade. The old, methodical manner of conducting transportation in its various branches has long passed. It gives many illuminating experiences of more progressive companies that have taken an aggressive, concerted action toward putting their own house in order before attempting to gain a more intimate contact with or expect the confidence and support of their riding public. It demonstrates with examples the benefits and profits derived by that utility which renders a service having a tone of modernization as to frequency, speed and comfort—the recognized factors of modern improvements for holding the present, if not to attract, increased patronage.

It would seem that the electric railway industry is enveloped by a peculiar economic law which controls its destiny yet requires proper solution before an era of good times is to be realized. This is an age of educated and skilled labor. This report signifies that necessity to the electric railway managing forces and demonstrates the need of instituting a movement to cope with present deficits by placing the

solution of the various problems in the hands of the specialist to produce a given set of fixed, remedial measures for maximum productive economy.

We, the Los Angeles Railway, have such a program. After two years operation with a new manual on methods and practices for rolling stock, track and overhead, we have increased the productive efficiency of our workers and elevated our standard of equipment up-keep. We have obtained higher scheduled speed, on a few lines, by conversion from two to four motors, using present equipment; have eliminated gear, wheel and body noises on many of the cars shopped; have witnessed our people's favorable comment on a few reconditioned cars of striking color scheme, upholstered seats and new lighting. We have purchased, for trial, two new cars of the one-man, two-man principle, with low and easily accessible platforms, upholstered seats, dome lighting fixtures, and suitable type of motors and control for obtaining higher acceleration rate and faster scheduled speed.

A recent completed survey of passenger origin and travel is being analyzed for improvement in distribution of present car hours according to the time, of day and travel demand factor. This report will lead us into the consideration of the merits of turn back or loop service for any car line and the economy of one-man type of car operation during Sunday load and night periods. We are also starting a power saving campaign by the installation of economy meters.

Coordinating with this study for betterment of service to the people is the employees' welfare work of the nature of group insurance, hospitalization, and the establishment of an employees saving fund.

CHAIRMAN WILSON:—Mr. Geibel, will you discuss the report?

F. E. GEIBEL:—I will read a discussion of the report by Mr. A. T. Mercier, Vice-President and General Manager of the Pacific Electric Railway Company.

[Mr. Geibel then read Mr. Mercier's prepared discussion as follows:]

DISCUSSION OF THE REPORT OF THE COMMITTEE ON OPERATING ECONOMICS

A. T. MERCIER,

*Vice-President and General Manager, PACIFIC ELECTRIC RAILWAY CO.,
LOS ANGELES, CALIFORNIA*

The committee is to be complimented on presenting such a complete report on the economic possibilities of today in the electric railway industry. Certainly the report is too extensive to discuss comprehensively in the brief time allotted. In studying the facts presented,

however, one reaches the very definite conclusion that what is "sauce for the goose is not always sauce for the gander", but the problem in any locality is peculiar to the locality and demands continual analysis. The more comprehensive these analyses can be made, the more nearly will the properties meet the demands upon the industry.

There is no question but that the public is demanding an attractive service—an attractiveness involving every feature of speed, safety, comfort and fare. Attractiveness, however, is relative, and from the report, it will be noted, ranges from the plainer car and bus service to the most elaborate de luxe limited service, with fares corresponding. It would appear, therefore, that the first consideration is a study of the service that can be given with existing facilities and equipment.

Such an analysis involves many of the points brought out in the report. Routing, assignment of equipment, coordination of rail and bus, schedules, stops, dependability, have all been touched upon and have been discussed at length from time to time.

Are we, however, making a continual self-analysis along critical and constructive lines, or are we basing our opinions on previous studies and consoling ourselves with the thought that we are following our usual practice? This I think suggests the importance of "cataloguing" our supervision of service, and then critically and constructively looking to ways and means of betterments.

The next step is developing our costs and certainly the accounting department can be of the greatest assistance. A too elaborate system of reports and cost sheets is not desirable nor essential. In many instances it is found by a more systematic arrangement of the basic data totals and sub-totals can be had with little extra expense.

Also such a system should provide for an easy study of various items if totals or sub-totals indicate the necessity for attention. Equipment costs for individual cars are desirable at overhauling only, principally as a check on shop output. Running repairs and inspection by classes afford ample control figures and an easy method of allocation of expense by lines. Track and overhead expense by sections and major items show interesting comparisons. Power and platform labor are two large items for study.

The traffic studies must be current to follow seasonal changes and provide the service as needed. The business will go elsewhere if the service is not there to handle it and much can be thrown away by continuing service after the business has gone. Traffic surveys should include potential travel, the volume, flow, present means of travel, and probable cost, if we are to forecast with any degree of accuracy the effects of service improvements, such as rehabilitated equipment, new equipment, one-man operation, limited and de luxe services, and fare adjustments suggested.

Certainly such a survey forms a very definite basis for proposed extensions of car or bus services.

Through the establishment of the proper relationship with the civic

organizations in the territory served, we are able, in many instances to obtain advance information on services proposed by others, on the thoughts of the public as to service requirements, and with this as a basis, studies can be made to justify extension of existing services or possibly the inauguration of new service into territories which are rapidly developing away from the established rail or bus lines. Communities are becoming scattered. Subdivisions are growing here and there. Populations move. Centers of population rapidly change because of these factors, especially in this territory where we are experiencing such abnormal growth from year to year.

We are convinced it is highly important that a well trained department, varying in size dependent upon the territory served, keep constantly in touch and make continuous studies as to the needs of expanding or extending the major lines.

Business getting involves all elements that go to make up an attractive service and to bring this service to the attention of the riding public. The improvements in cars, seats, schedules, dependability, courtesy, have all been factors towards attracting business.

On the subject of advertising and newspaper publicity, etc., as a new form of advertising, I would like to suggest to the committee that they investigate the talking picture. It has a value in training the employees, better qualifying them in their association with the public, for regardless of what we do in the way of providing modern, up-to-date equipment, unless our men, who are our public contact, are trained to maintain the proper attitude towards the public, our efforts will be for naught.

Other public utilities recently, have used this means of advertising effectively in every respect, and I would suggest to the committee, that during its studies of the coming year, they give this medium of advertising their consideration.

Finally, in mapping the work for the committee for the coming year, it would seem well to give consideration not so much to the compilation of statistics of the various properties, but to a study of the desirable statistics and costs, and to the actual machinery of obtaining these reports. Too often, one's expectations are based on estimated values and guesses instead of on actual costs and basic data on our operations.

CHAIRMAN WILSON:—We shall be pleased to hear from anyone who wishes to discuss the report. [There was no response.]

Gentlemen, I don't want to hold you here, and, by the same token, I don't want to close the meeting if there are any of you who will talk to us on the subject of operating economics.

L. R. NASH:—I regret that I haven't had an opportunity to read this report and digest its significance, but I have been

particularly impressed with one thing in the discussion which I think is of most profound significance, not only to this Association but to our companions, the Accountants' and Engineering Associations.

We have been brought up more or less with the idea that our charges for our service should be fixed by costs. The thought has been presented that the situation is exactly the reverse, that our costs should be fixed by our charges. Within certain limits, our charges are defined for us either by economic conditions, the value of our service, or by regulatory fiat. Whichever the basis of fixing, it is still a fact that our rates are fixed within certain limits.

Within such fixed rates we are free to develop new business and expand our activities. But after we have reached those limits we are then confronted with two alternatives: shall we go on with our normal analyses and recognition of existing costs and of meager, negligible, perhaps negative, profit or shall we readjust our costs, as I believe we can, so that our operations are profitable? All that means, of course, very exhaustive study of costs and the opportunities of revising them to new, lower levels.

I would like to comment further on the analyses of costs of electric railway service, referred to in Appendix B of the report, and carry Mr. Ong's criticism one step further: He suggests that, for certain items, cost analyses should be based on car miles rather than on car hours. I think for refinement such as we need under certain conditions, that that should be carried further, with respect, at least, to power, to a ton-mile basis.

Our equipment varies widely in size and power requirements. In a city like San Francisco the power requirements vary, not only with size, but with grades. So we have the element of foot pounds entering into it, which you do not ordinarily, of course, encounter.

I have made a good many cost analyses and I am going to continue to have my fingers crossed when I do it. There is first this factor of adjustment, adjusting our costs to restricted revenues, that we must take into consideration. Then in other lines of public service in which I have been interested and in

working on committees studying these subjects for gas and electric power industries, we have come to the conclusion that a cost analysis, with respect to different classes and types of service, may be very elusive and misleading. In fact, we have gone further than that and have discouraged, in many cases, cost analyses which, in the hands of people who are not familiar with their significance and characteristics, may be used in a harmful way.

Our railway business lacks the wide range of characteristics that these other classes of public service I spoke of have, but I still think we must watch our step carefully in our cost analyses.

We have—or at least I have, in my study of the electric railway industry—heard little about increment costs. In other classes of service, such as electric power, increment costs are exceedingly important, and studies of them determine the rates for the service. And perhaps by the reverse process, of finding out how much we can get for a particular class of service, and forcing ourselves to adjust our costs accordingly, we can develop a substantial volume of new business. We have opportunities of that kind in the electric railway field, as well as in the other classes of public service.

E. F. THAYER:—I note that in the conclusion of the report the committee suggests that in the future the studies consider the substitution of buses for street cars.

I thought it might be an interesting sidelight, in considering the question of trolley buses, to cite an experience which we had in St. Louis.

I noted in Salt Lake City, during our visit there, the successful installation of trolley buses in place of street cars, and we were informed that the change over from one service to the other had been made without very serious objection on the part of the public, and that there was a pretty general public acceptance of the wisdom of that change.

We recently attempted to substitute trolley buses on one of our cross city lines in place of gasoline buses, and we met quite a storm of public protest. So that, apparently, at the present time, the trolley bus occupies a midway position between the street car on one side and the gasoline bus on the other.

If there is any consideration of substituting trolley buses for street cars it may meet with public approval, but if there is a consideration of substituting trolley buses for buses the public seems to feel that a step backward is being taken.

CHAIRMAN WILSON :—Would anyone else care to discuss the report? If not, we will adjourn until 10 o'clock tomorrow morning.

[The meeting adjourned at 3:40 P. M.]

THURSDAY MORNING SESSION

JUNE 26, 1930

The third and last session of the Transportation and Traffic Association Convention convened at 9:20 o'clock in the Fairmont Hotel, San Francisco, California, First Vice-President Paul E. Wilson, presiding.

CHAIRMAN WILSON:—The first order of business is the report of the Committee on The Passenger, by W. W. Holden.
Mr. Holden!

[Mr. Holden then abstracted the report which is printed in full as follows:]

REPORT OF COMMITTEE ON THE PASSENGER

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN: For the year 1929 your Committee on "The Passenger" viewed its assignment as a different one from such committees as functioned in the past under the name of "Service Betterment" or "Merchandising Transportation." It was felt that these subjects had been handled most capably by those committees. It was also felt that most street railway companies were adequately in touch with the problem of determining the flow of passenger traffic in their respective cities. Therefore, it was decided to accept the assignment in the light of carrying this work a step farther than it had been carried before. This new step was to determine the attitude of the public in general as well as the patrons of public transportation toward the service which the street railway companies are rendering.

Many checks have been made in our various cities to determine how many people are using public transportation and where they are going. Many experiments in changes of service, both as to equipment and schedules, have been conducted and results obtained showing how many additional people use the service so furnished. Relatively no research has been made to find out why people use public transportation or why they do not use public transportation. Such a study might be termed a qualitative analysis of public transportation business as compared with the quantitative analysis with which everyone is familiar in the form of passenger traffic studies. This is the next step which the passenger committee is endeavoring to investigate.

A knowledge of the reasons back of the use or non-use of our street railway service by the public can be of inestimable value in determining

what changes in service will be both valuable and practical to offer to the public or conversely such a knowledge will be essential in deciding what service changes are impractical and of small value in procuring more riders.

Such an investigation of the reasons for purchasing articles by the public is termed a "Market Analysis" and this is a relatively new field of endeavor in all businesses and particularly so in the street railway business. Therefore, your Committee found practically no information of this nature available in 1929 and recommended that the Association take steps to secure market analyses of the street railway business in some of our cities in order that a report could be made to this Association. This recommendation was accepted and the 1930 committee on The Passenger was instructed to carry on this work.

From the previous study of this problem* it is clearly indicated that such information should come directly from the individuals who constitute the public and the most satisfactory way to secure this information is by personal interview. The knowledge of transportation conditions gives the transportation employee a special advantage in securing valuable information of this sort, but on account of the fact that there is a tendency among transportation employes to endeavor to sell the company services rather than to secure information from the public, special instruction and training is necessary in order to secure an open mind attitude on the part of the investigator. It is only through such an attitude where the adverse reports as well as the favorable are given their proper weight that a true picture of public thought can be obtained. Considerable skill in conducting interviews is necessary in order that the desired information can be elicited.

It is not necessary to interview everyone in a city in order to determine what the public thinks, but if certain typical sections of a city are studied, that will normally indicate very clearly the trend of public thought.

With the above situation fully in mind your 1930 Committee developed the following plan:

MARKET ANALYSIS PLAN OF THE COMMITTEE ON THE PASSENGER OF
THE TRANSPORTATION AND TRAFFIC ASSOCIATION OF THE
AMERICAN ELECTRIC RAILWAY ASSOCIATION.

It is felt that a real knowledge of the desires of the people as a whole for public transportation is essential to the industry. It seems logical that this information should be obtained directly from the people themselves.

The purpose of such a market analysis would be to determine whether more rides may be sold to the present users of public transportation and whether those who do not now use the street cars and buses can be induced to do so.

* See 1929 report of Committee on The Passenger and the discussion of this report as published in the 1929 Proceedings of the Transportation and Traffic Association.

In order to establish a scientific and uniform method of making market analyses by street railway companies the Committee on The Passenger has selected a man with considerable experience in this work to be scheduled to visit a number of different properties and to assist and instruct them in the making of a market analysis. Dr. W. J. Reilly has been selected by the Committee to undertake this work. He would be required for a period of from two to four days for instructing the local men in the methods of securing information and analyzing results.

The Committee agrees with Dr. Reilly in feeling that it is highly important to interest and acquaint certain key men on each property with the proper methods of taking samples for surveys, making the actual surveys, and analyzing the results. First of all, they will have a more active interest in the survey, be more sympathetic in their attitude, and will be much more likely to get results than if the entire job were handled by outsiders. Second, on each property there would be built up the nucleus of an organization for conducting almost any type of survey for which the necessity might arise later. Third, the actual out-of-pocket cost to a company would be much less on this basis than if the work were performed entirely by outsiders.

In order to keep down expenses and also in order to build up on each property a small group of key men familiar with a method of making and analyzing business surveys, the following is suggested:

1. In advance of Dr. Reilly's arrival on a property, there should be prepared a map of the community showing all of the transportation lines and sufficient information concerning the character of the community, density of population, etc., to enable him in consultation with officials of the property to select, in one day, the sample sections for survey.

2. Also before his arrival at a property, the management should select two or more key men in the organization who are to assist on the first day in making the determination of the sample sections to be surveyed, and are to accompany Dr. Reilly on the second day in order to familiarize themselves with the actual methods of interview and of recording and analyzing the data obtained.

3. A third or even fourth day may be spent in further interviews, depending upon the size of the community or the extent of the survey.

Certain cities were selected as typical of varying conditions throughout the country and particular consideration was given to those who have been making an endeavor to merchandise their transportation. Each of these cities is expected to pay the cost of its own market analysis and the completed information obtained is to be furnished to your Committee for concentration into one report. A sufficient number of companies have accepted this plan to assure its accomplishment, but the work can not be completed in time to present a report to the convention in June, although it is hoped that the actual work of making the market analyses will be finished by that time.

Your Committee therefore recommends that the work of the Committee on The Passenger be continued for another year in order to complete the study which has been undertaken.

Respectfully submitted,

JEFF L. ALEXANDER,
HUDSON BIERY,
D. E. BLAIR,
W. B. BRADY,
C. M. CHENEY,
H. O. CREWS,
J. B. DONLEY,
JOHN F. GALLAGHER,
D. J. GRAHAM,
JOHN R. MARSH,
E. B. SANDERS,
EUSTACE SMITH, JR.,
R. N. GRAHAM, *Sponsor*,
WM. W. HOLDEN, *Chairman*,
Committee on The Passenger.

[Mr. Holden's presentation of the report is as follows:]

WILLIAM W. HOLDEN:—This committee has had extreme difficulty, both last year and this year, in getting the information necessary for a proper report. Very few businesses of any sort have attempted an analysis of their business possibilities and this business of ours, particularly, has done less in this direction than some of the others. Therefore, when we endeavored to get into this type of work we found it very difficult to find any precedents to follow.

Last year the committee developed a general plan by which a market analysis could be made. This year they developed a more definite plan and urged certain members of the Association to adopt it. A number of them did. It involved the employment of a man who earns his living making market analyses for various classes of business. He visited these properties, not with the idea of being able, within three days, to give these companies the answer as to how to solve their difficulties; but of showing them a means of securing additional light on their business which they could follow up and which would assist in solving their difficulties.

We have been rather inclined to neglect the point of view of the public; to think that we know what the public wants; to

think that a traffic analysis showing which way people are moving gives us all the information that we need to conduct our business.

The committee on The Passenger has tried to introduce the idea that we need to know not only what our passengers are doing but also what the other people who are not our passengers are doing, and why they are doing it, with respect to the use of transportation.

In a sense, in furnishing transportation, we are hosts. How many of you have gone to a party where you were bored to death? The best part of the party was when you said "good-night." Yet, you realize that your host in planning that party, had expected to give you a good time, but not knowing what would give you a good time, had made you spend a boring evening. All of us have had that experience.

Isn't it possible that in furnishing street car and bus service we too, with the best intentions, may have a wrong impression as to what our passengers really want? Particularly, haven't we made a bad guess in trying to determine what those who are not passengers want?

I might make another illustration of the purpose of the market analysis which the committee recommends.

Suppose you were to break out in boils, and you went to a doctor. The doctor would, of course, treat the boils, but he would undoubtedly say, "You are in a run down condition." And he would make a complete study of your entire physical condition.

When we get a complaint from one of our passengers, maybe a very violent complaint, isn't that rather like a boil breaking out? Of course, you answer the complaint but in doing so have you done anything more than give a superficial treatment of the situation? You have merely taken care of the one place where trouble broke out. As a matter of fact, we all know that complaints come from a very small percentage of our patrons and they usually represent people of abnormal minds. The general run of people take what you give them, and use it if they like it, and leave it if they do not. They never say anything about it to you or anybody else. They simply either do or do not use your service.

The market analysis is an attempt to diagnose our troubles, just as a physician would diagnose your physical condition.

It might be possible, looking at it from the extremely pessimistic side, that a market analysis of our business would show us that we have pernicious anemia, which physicians say is absolutely incurable. Even if we do, isn't it well worth the price of a diagnosis to know that all we can do is to go on a conservative diet and not spend money recklessly on quack nostrums and things, to pull us out of a hole from which we cannot be rescued?

Looking at it, as I say, from the worst side, a market analysis of your business, a study of what your passengers desire, may show you that it is ridiculous to spend money for pink curtains at the motorman's window, or for many other things you might think would attract patrons. It might show it is utterly useless to make substantial additions to your schedules. And, even if it should show the worst, that you are in an utterly hopeless condition, it is worth a great deal to us to save spending money foolishly and uselessly. On the other hand, an intelligent interpretation of the wishes of our passengers certainly should be of great value and benefit in determining the things that we ought to do.

I might take occasion to mention the work of the President's Conference Committee, which is endeavoring to build and design a new type of street car. I am heartily in favor of that activity, but I feel that it is rather putting the cart before the horse, if it is done without a previous study of the desires of our passengers. The desires of our passengers, and particularly of those who are not passengers and whom we want as passengers, should be incorporated into the features of any design of vehicle which the President's Committee may be studying.

This year the committee on The Passenger arranged for a number of these analyses to be made. They have been completed, but they were not done in time to report on and analyze them at this meeting. The study will be completed in a very short time, however, and the work of the committee will be carried on.

I want, particularly, to urge each of the companies represented here to cooperate with the committee in a further effort to determine what our passengers want.

CHAIRMAN WILSON:—I will call on Mr. W. H. Lines, Vice-President of the Pacific Northwest Public Service Company, of Portland, Oregon, to discuss this report.

W. H. LINES:—I would like to open up my short discussion of this report by an apology. When the committee decided to select a number of typical properties around the country for making a proper market analysis of the needs or requirements of the potential traffic, Association headquarters approached our company in Portland and notified us that we were selected as one of the typical properties. At the time we were quite busy with other things which we thought were of more importance. We didn't know very much about this market analysis so we decided that we would defer having one made on our property at least for a time. I wish to apologize to the committee now because, after coming to the convention and talking with various members and, above all, talking with some of the managers of the properties on which these analyses have been made, I am convinced that a great deal of good can and will result from a proper market analysis.

In Portland, in common with all other properties, I suppose we have been prone to fit the requirements of our service to the actual traveling needs of the public. In other words, for years we have been keeping the usual peak load checks and we have put on just enough service to suit our own ideals and our own standards, always bearing in mind that there is a minimum beyond which we could not go particularly during the off peak hours. In other words, we took the position, "Well, sir, if you are going to travel on our street cars we will see that you get a convenient and safe ride," but we haven't made the attempt we should have made to develop the potential possibilities of our business.

I think we could draw a comparison between our business and that of say a manufacturer of some certain commodity. He has built up a business over a period of years by producing a good material. Just suppose, if you will, that he should take the position that there is just about so much of my product which can and will be consumed and I will devote all my energy to manufacturing that product in that particular amount. How

long do you suppose that manufacturer would stay in business under modern competitive conditions? The answer is, of course, obvious. If that is true in an ordinary line of business, it is certainly true in ours because we are, as you all know, subject to competition much more severe and much harder to meet than the average commercial undertaking.

I believe that a market analysis will show us, if it is properly planned and conducted, a great deal about ourselves which we have not as yet known. In other words, it will show us the attitude of our potential customers; it will give us ways and means of meeting that attitude and the opportunity, by intelligent commercial effort, to stimulate riding on our street cars.

There are many ways, in my opinion, in which these market analyses may be of considerable use, not only in stimulating business but perhaps in proving or demonstrating that certain types of unprofitable business which might be offered can be logically and properly refused.

All of our cities are growing. You are familiar with the demands which are made on you, from time to time, for new and added service. These demands in many cases, when met, result only in additional losses because the traffic is not sufficient in these outlying districts, or new districts, to warrant the service and it is one of our most vexatious problems. It is difficult in Portland, and I know it is elsewhere, to convince the people who have located at distances comparatively remote from existing means of transportation that the operating company cannot afford, under conditions which obtain at the time, to give them transportation. We can send our own transportation people and our traffic people out to the field and we can judge quite accurately the amount of business which will result from one of these new subdivisions, or new neighborhood districts, in the city. But we cannot convince the people who want and desire the service that our figures are correct. And sometimes, after having refused the service, they will take it up with our various regulatory bodies, or our city councils, and perhaps we will be forced into a position where we must provide that service rather than take a chance of some competitor coming in and not only serving that particular territory but using that service as an excuse to parallel some of our incoming trunk lines.

If we had an intelligent survey, a cross sectional idea of the transportation habits in one of these new districts already served by a bus line, we could tie the data so obtained from that survey into our actual earnings from the particular feeder line serving that district. I am sure that the data thus obtained would go a long way towards convincing the petitioners that the company could not afford to provide that particular service because it would not be an idea of the company, but it would be an idea of the people in that particular district themselves. I think this is the field in which a market analysis could be used to considerable advantage.

In Portland we have been faced with a rather serious situation. Our earnings are declining, of course, as they have been on many other properties. In an attempt to start some measure of relief, about a year ago we filed a new tariff with the Public Service Commission creating a ten cent fare on our city lines. We didn't want a ten cent flat fare but we wanted to bring matters to a head. The city intervened in the case, and they appointed a firm of engineers, experts, to analyze the situation and see if there were any means by which this ten cent fare could be prevented. The experts came to us and we opened our books and our records and told them the whole story. To make a long story short, they soon decided that there was no way a ten cent fare could be prevented without a radical surgical operation. They recommended to the city council that we be given a new franchise; that the company be relieved of several imposts and burdens under which it had been operating for a number of years, such as bridge tolls and paving costs. They went further. They recommended that the city actually take over the ownership of the rails and the paving areas and maintain and reconstruct it, under the theory that the street car rider was just as much entitled to consideration as the rider in any other types of vehicles, and that the city and the taxpayers were providing streets and highways for the use of private automobiles, for the use of taxicabs, and for the use of trucks, but were providing nothing for the use of the street car rider. In fact, the city was not only not providing, but was levying on that street car rider very serious burdens, and discriminatory burdens, in the way of imposts. They recommended all that be

done away with and that the city actually take over the ownership of these rails. Of course, that was a radical idea; it was rather surprising to see how the press of the city responded to it. Some of the papers which had most bitterly attacked us, in our effort to secure a ten cent fare, came out in favor of this so-called city plan on the theory that if the car riders should be relieved of these burdens the city could undertake to provide a means of operation of our cars and that not only could the fares be reduced but a better transportation system could be evolved, equipment could be modernized and the service rendered which would be of considerable benefit to the city.

I am telling you of this incident in some detail for a reason. The charter of our city provides that none of these things can be accomplished without a vote of the people and so it is necessary that the people, in the fall, vote on these particular measures. I believe that if our company could make an intelligent survey of typical sections of our city, get their reaction to this proposed plan of the city, it would be of very considerable value to us in finding out the weak spots, in finding out the attitude of the people towards the plan. It is important, of course, from our standpoint, that this plan shall carry. We are not sponsoring it, we are not actively fighting for it. We are letting the city do that on the theory that the people will be more apt to vote for something which the city itself is putting up, which the city experts recommend, and which is for the benefit of the city and not the carrier, than they would be if we sponsored the movement ourselves.

So I believe that a market analysis would be of great value to our company in getting a cross section of public opinion on this important measure which will be before the people. And I am prepared to go back and recommend to our people in Portland that such an analysis be made.

I believe that these things have possibilities much further than the stimulation of business. I would certainly recommend that you all follow the further work of this committee and apply it to your own local needs.

CHAIRMAN WILSON:—Is Mr. J. P. Potter, Vice-President of the Key System Transit Company of Oakland, in the room?

J. P. POTTER:—I think it would be perfectly proper and right if I should say to you I don't thoroughly understand what the market analysis is intended to convey. I will say, however, that a uniform market analysis of a number of different properties of various sizes would probably bring out some outstanding features that might be of benefit to the carriers. You would probably get a great many recommendations and suggestions which might apply to the properties analyzed.

In 1926 our company made a survey of a certain section of the Key System property to try to determine what the public attitude was toward the street railway property we represented. A city of about 40,000 population was selected in which to make this survey. We made a day and a night house-to-house canvass by very intelligent platform men in uniform.

The express purpose of this undertaking was to determine just exactly what the people thought of the property, what they thought of the service and what, if any, recommendations they had concerning the service, the equipment, headway, or anything else that would tend to assist us in making a service more attractive, with the view of increased patronage.

We found a very friendly attitude of the entire community surveyed. There were some complaints from people who had been involved in accidents, some complaints in regard to the type of equipment operated and in regard to the height of the step on some of the cars operated in that territory. Aside from that, the survey demonstrated that the people were well satisfied with the service and had a most kindly regard for the company.

We found that practically every house had an automobile and that for every member of the family who rode on the street cars there were two who took the automobile. It was quite pronounced in that section that the people were sold on the automobile, primarily due to the fact that the latter provided a more convenient and quicker means of reaching their destination.

Little regard, however, was expressed concerning the cost of the car ride as compared with the automobile ride.

I am not opposed to a market analysis. I want to compliment the committee before I say anything that can be construed as

opposed to a survey, investigation or a market analysis. I think it is a very excellent idea providing it is to be made on different properties of various sizes and a comparison made to determine what the outstanding conditions are on each property which will no doubt demonstrate what the analysis is intended to convey.

I am wondering if we, as carriers, have given the consideration to the service and the people that we should have given. I wonder if we haven't been sleeping on the job for a great many years in regard to the conditions of our equipment. The modern automobile is convenient, comfortable and attractive and in order to retain our patronage or enjoy any increases we must discard some of the old antiquated equipment and keep pace with advanced methods. There are very few properties that have expended much money on equipment. We all know why; it is due to the fact that the street railway business hasn't been profitable and capital is not interested in large expenditures for new equipment under the present earning power of the average street railway.

What the street railway needs more than anything else, in my opinion, is the confidence of the traveling public and the community served. Just how we are going to gain that confidence is a question.

We may mould favorable public opinion by making a house-to-house solicitation, canvass or market analysis, but it is my opinion we already know that the public wants service more than anything else.

Suppose we should try the open book policy, take the public into our confidence and show just exactly what the conditions are on each one of these properties; show that the property owner has some responsibility in order to have satisfactory service and extensions, and that the burden of responsibility does not all lie with the street railway property.

If you are engaged in any manufacturing business you must first show just exactly what your product is, what you have, and what you are going to do, before you can get new money and that is just exactly what the street railways of this country have got to do and it appears to me that it is the only way in which they can be made successful. Go before the public and

tell them just exactly what the conditions are, bring that issue back home to the extent that they will begin to realize they are interested in the transportation problems of that particular community and that it is not a responsibility for the transportation company to solve alone.

Property values all over the country are based on transportation. Property owners and business men realize it to the extent that whenever an application is made for the discontinuance of a rail or bus service, the entire community protests, and, for the first time you find what a valuable asset you are attempting to take away from the people.

There is no question about the public not patronizing the service as consistently as they should; it is partly due to the fact that it isn't up-to-date service and primarily due to the convenience and attractiveness of the automobile. Just what fundamentals are required to get more patronage is a question, but, I am of the opinion that the first thing to do is to improve the service, and properties that cannot afford more equipment should, at least, make the old equipment as attractive as possible by frequent painting.

Unfortunately nearly every property is burdened with non-revenue producing lines to the extent that the trunk and revenue producing lines are carrying the burden of maintaining the outlying sections.

We made a change in a city of about 40,000 population where severe rail restrictions and burdens were imposed through political and municipal conditions. After a long controversy it was decided to withdraw practically all of the rail service and substitute bus service.

We installed bus service with buses having a seating capacity of 40 passengers, removing all of our rails and poles. The change has proved fairly satisfactory. The public is well pleased with the service which is very well patronized. It is operating on a two to eight minute headway to meet the requirements of the traffic.

The only bad feature about the bus service is the carrying capacity. The flexibility or routing from an operating point of view is superior to rail service but the carrying capacity of the rail service is much more flexible.

As I previously stated there is still a question in my mind whether the market analysis is intended to determine whether you can extend service or improve service. One means extensions and capital investment; the other means improvement. The extension depends upon the territory to be serviced. If it is a non-revenue producing territory there is a grave question in regard to the extension. If it is intended to improve the service I would be heartily in favor of it.

It is to be hoped that the market analysis will bring a solution to the principal problem and that is the obvious futility of attempting to sell the public something they do not want. A merchant sells an article for which the opportunity of another sale to the patron does not exist until the article is used up or worn out, while our product of transportation requires a continuous selling operation hourly and daily to practically the same persons. It is therefore evident that my reference to improved service and more comfortable equipment has significance, inasmuch as it points the way to increased street railway patronage or, to be more exact, to salvage some of the traffic from the automobiles. The novelty of the automobile has worn off, and the density of traffic and parking difficulties have begun an irritation that is sure to result in a more favorable public attitude toward the street railways.

Those are my views in regard to the market analysis. If it is made to improve the present conditions, to determine if we should have additional service, or to determine what the public would like, and if it is made uniformly on several different properties, I feel that it will be a great benefit. But if it is made to determine the advisability of extending into outlying, non-revenue producing territories, I think that you have the answer at the present time.

CHAIRMAN WILSON:—I will now call on Mr. O. A. Smith, Passenger Traffic Manager of the Pacific Electric Railway Company, of Los Angeles.

O. A. SMITH:—I am not a member of this committee, but if I had been, I cannot conceive of any different or better report that I might have recommended. I have read and studied the

report very carefully, and it is absolutely along the lines that my mind has been working for the past several years.

I am very frank to say that I think all companies, and I make no exception to my own, have been very lax in getting down to the basic principle of this business, which is the merchandising of it. We can operate economically, we can do this and we can do that, we can save money and we can operate safely, but the fundamental principle in the first analysis of any business is to get in the revenue. Of course, that happens to be my business in connection with the company I represent. Certainly the best way to get in revenue is, first, to know what your people want. I certainly hope that the work of this committee will continue along this line because I think it is properly directed. There are a thousand things too numerous to mention that, in my opinion, can come out of work carried along this line.

I have in mind, to be covered by this analysis, something that has not been suggested by any of the previous speakers, and I say it frankly to you gentlemen, based upon some experience that we have had. It is quite possible you do not know what the results on your property would be under a different rate of fare. It may properly be, and other manufacturers have found it out, that you would be far better off financially by taking a reduced fare or making a reduction in your fare, than by increasing your fare; and, it may be, on the other hand, that a higher fare would help.

I know that the natural tendency, when times are hard and traffic is going down, and expenses are going up, is to increase your fare. I say that advisedly because my own company has had a material amount of experience in reducing fares. In our case those reductions have been beneficial but it may not be the proper thing on your property. You won't properly know that until you have had a market analysis.

Let me give you an idea of what I have in mind. The Pacific Electric operates a local service in a number of communities in southern California. We have had established all kinds of different fares ranging from 5 cents to 10 cents. But prior to the time we made any changes in the fares, that is two years ago, they were usually on a 6 or 7 cent fare.

In the city of Pasadena, a town of approximately 75,000 population, we established a fare of 6 cents originally, selling 10 tickets for 50 cents, or 5 cents per ticket. We increased that fare to 7 cents, with 8 tickets for 50 cents, which is $6\frac{1}{4}$ cents each. We immediately found an increase in revenue for the first 8 or 10 months. Since that time our revenue has been going down and it is now lower than it was prior to the time we changed the fare.

In the city of Glendale, also a town of approximately the same size, neither one of them being business towns, but largely residential suburbs of Los Angeles, we had the same original fare of 6 cents, with 10 tickets for 50 cents. We have decreased the fare to 5 cents, and we have more than doubled the traffic. While we are still operating largely a motor coach service, both rail and motor coach, at a small loss (the lines are, of course, feeder lines to the main Los Angeles interurban system, as well as providing a local service) yet, the losses have been materially reduced and we have reached the point where we are making something above our out-of-pocket operating expenses on that service. In other words, the situation unquestionably has been materially benefited by the change in that fare.

I say frankly that we had nothing to do with the change in the fare. It was suggested by the engineers of the Railroad Commission. In that particular case it was of extreme benefit. We now have, due to the experience in Glendale, a proposition up for a change in the fares in the city of Pasadena.

I cite that as an illustration, not to establish the fact that it would work in every community, but to point out that an analysis, properly made, of the conditions in a community should show whether or not it would work in that community.

We have even gone further. We have made material reductions, in some cases as high as one-third, in the interurban fares of the Pacific Electric Railway. We took an extremely heavy loss for the first 8 or 10 months, but I want to say that we are better off than we would have been operating under the old fares.

That is merely another illustration and again I want to emphasize the fact that reduced fares may not be the solution

in your individual communities. But it certainly is enough evidence to indicate that a proper analysis of the conditions in your community would be of value. That is the point I want to bring out.

I conceive also that an analysis properly made by some one competent to do it will have a very beneficial effect for all of us in the matter of establishing service, or regulating service, and things of that kind. In my experience we do a lot of things that we really don't want to do, but are forced to through political pressure and through what you sometimes conceive is the wish of the people living in a certain community, although that wish oftentimes is the desire of merely one element. I have in mind, particularly, in that connection, real estate men who when they want to develop a tract or sell some property will tell you how important it is that the service be provided out there. A proper analysis of the situation will take in all elements of the community.

I feel that an analysis properly made by some one, possibly outside of your company, could be of great advantage in presenting cases to the city authorities. Outside opinion by some one competent to express that opinion always has a very material effect, more so than your own opinion, which is regarded as biased.

I certainly do think that work of this kind is getting down to fundamentals. The psychology of the citizens of the community is something of extreme importance. We are prone to overlook, in my opinion, too many of the miscellaneous suggestions or complaints that are received with the feeling "Well, he doesn't know anything about it."

I received a letter in my mail here yesterday written by Kenneth C. Beaton of the Hearst papers, who signs himself "K. C. B." He wrote an article and addressed it to me in which he roasted a bus service, particularly the type of bus that we run in his section, and what he says about that bus being old and antiquated is something terrible. He is an important personage and we pay attention to something he writes for two reasons: because he writes it, and second, because it is read by thousands of people.

You cannot tell, just from our observation, what will result

by changing your service, changing your fares, or changing your equipment, as Mr. Potter has suggested. A proper analysis of the situation will give you, I believe, some indication of what the possibilities are of these proposed steps.

It seems to me that this is an extremely important subject and I certainly hope that the work of the committee will be carried forward.

J. P. POTTER:—If my memory serves me correctly, Glendale has increased in population more than any other city, I guess, in the United States, and I would like to ask Mr. Smith if, in his judgment, the increased riding habit he mentioned is due wholly to the reduction in fares or is due partly to the increased population?

O. A. SMITH:—We have been operating a bus service there for about five years. I take it the population in five years has just about doubled, but when the local traffic increases from 25,000 to better than 125,000 a month, that is a greater increase in percentage than the increase in population. I am speaking roughly, since I do not know the exact figures. The situation there, of course, is a radical example. I say that very frankly. I cannot conceive of any other place where you can change the fares and get the same results we got in Glendale, but if we got only a 10 per cent increase you can see how we would benefit.

J. P. POTTER:—If your traffic increased to that extent due to the decrease in fare, it seems it would be advisable to establish a lower fare on the whole system.

O. A. SMITH:—We were operating motor coaches at a revenue of about 10 cents a mile prior to the time we made the change. We are up now very close to 20 cents. We have added service, of course, but as I say we are making the out-of-pocket cost of service. We are operating a small type of coach there and that is what it has done in that city.

In Pasadena, on the other hand, the revenue per car mile has gone down where we increased the fare.

CHAIRMAN WILSON:—Does anybody else care to discuss the report?

W. W. HOLDEN :—Mr. Potter mentioned that he used a local man for interviewing. I merely want to caution you, that in using a local man, he is quite likely, out of loyalty to his company, to endeavor to sell the service rather than to find out what the public is thinking. It is not difficult for an employee to learn the right way, but he must learn how to interview correctly in order to determine the public's attitude. Otherwise he invariably attempts to sell the service, gets into an argument by telling how good it is, and fails to get the real attitude of the public.

With reference to any change that is made in the service, whether it be an extension or otherwise, depending on your own conditions, the sole purpose of a market analysis is to give you the opportunity to look before you leap. Many of the service improvements will produce desirable results, but if you look over the situation before you adopt a plan you may find that the improvements that you are considering will not pay for themselves, whereas some other similar and less expensive improvements might bring you far greater returns.

Mr. Smith spoke of how valuable a survey would be in order to refute the arguments of some constituted authority or in trying to change their opinion. In this respect, my idea of the value of a market analysis is to find out what the public wants before they realize it themselves and to give it to them before any action is taken by the constituted authorities to force you to provide what you should have given in the first place.

CHAIRMAN WILSON :—I will ask Mr. Walter Jackson to comment on this report.

WALTER JACKSON :—I happen to have had the good fortune of reading a typical survey made in accordance with the ideas expressed in Mr. Holden's report. This survey was completed about a month ago in the city of Roanoke, Virginia, for the Roanoke Railway & Electric Company. The company gave the survey organization certain areas to analyze. One area was composed of what we might term the "silk stocking class," but not an ultra-silk stocking class; a class, however, in which close to 90 per cent of the people owned automobiles.

In the other class between 65 and 70 per cent of the people owned automobiles.

A series of questions was offered to determine how the patronage of the company was divided according to the rates of fare in use. These are, cash, 7 cents; token, four for 25 cents; and a weekly pass for one dollar.

In the silk stocking class it appeared that 17 per cent of the car-bus rides to and from work were taken on the pass. In the working class area, 36 per cent were taken on a pass. I mention these two figures because the survey appears to have proven out very accurately, inasmuch as the actual pass proportion in this town corresponds very closely to the figures found in this survey for selected blocks.

What proved very interesting was to find just what the so-called regular class of riders did. You know what a pass is. A person who has it doesn't have to think of the cost of his ride and, therefore, much of the inertia and resistance to using the service is broken down. Nevertheless, even though the pass owners had unlimited use of transportation, there was also so large a proportion of automobile ownership that they did not always make use of their extra ride privileges.

In the silk stocking class, one-fifth, or 20 per cent, of the pass holders went home to lunch. In the poorer class, only 14 per cent went home to lunch. The poorer class has a larger proportion working in mills, with a luncheon period too short to permit a round trip at noon.

In the evening, when travel is not by individuals, but rather in couples or families, to some place of entertainment, it was found that the pass holder in the wealthier territory took advantage of his pass 30 per cent of the time, and in the poorer area 40 per cent of the time.

To make you appreciate what value there lies in such a house to house canvass, you will be interested to know that in the poorer group, which comprised homes having a joint income of from two thousand to five thousand dollars a year, there were many persons who frankly said that they would make more use of the automobile if it weren't so expensive. We have all been believing that the automobile owner doesn't reckon cost. That has surely been true to a very great extent,

but we are just now in an economic stage where a lot of people are thinking of costs. It behooves us to take advantage of this, either by retaining the rates we have, or finding some way of making the rates more attractive, rather than boosting our prices and thus keeping away people who might return to us.

The survey also covered a series of questions to housewives. They were asked how often they went to town and how often they went out in the evening. Any one who believes that these surveys won't return their cost need only look over this particular series of answers. You wouldn't believe that there could be even four or five per cent of the families in a town of 50,000 or 60,000 where the women go down town only once a month, apparently to pay bills. A surprising number go down town only once or twice a week. That doesn't mean that they go by trolley or bus. They do go some way, but they don't go many times.

When you analyze what people do at night you can begin to realize the tremendous inroads of the radio on evening riding, whether that riding is taken by automobile, street car or bus. When people of lesser earning power can get their entertainment without stirring from the home they are enormously influenced to stay home.

I believe that this survey indicated to the company the great desirability of a closer cooperation with the merchants of the community to induce more face-to-face shopping, rather than using the telephone which is now in almost every home. It indicated the need for a similar close cooperation with the entertainment interests of the community, because the theatre man is in for a bad time when he gets to the point of putting in "Amos and Andy" as part of his show, so that the people will have an inducement to come to him instead of staying at home. Since his interest and ours are absolutely identical in moving the "body" to the theatre, such a survey as Mr. Holden has suggested in his report is extremely desirable.

None of us should think that we know public opinion just from the contacts of those we happen to know, our personal friends, or the people in our own class or our own business. We don't know the people as a whole. We have got to learn just what they are thinking. Although I have frequently asked

clients to do this very thing with their own men, I agree with Mr. Holden it is better that such a survey should be made by interests completely outside of the business, people who are professionally trained in interviewing and who, unlike myself for example, have no particular kind of fares or service to advocate, but who do know more about human nature than we do.

J. P. POTTER:—Mr. Holden, are the properties that are making this analysis of uniform size?

W. W. HOLDEN:—The properties on which the analyses have been made, and on which we have not yet received reports from the committee, are not of uniform size. They vary not only in size but also in location.

We did not get as complete a distribution as to size and geographical location as we had hoped for, but we did get a fair representation. Possibly we will endeavor to interest some more properties before we turn in a final report as to the national significance of this market analysis.

G. B. ANDERSON:—Which city canvassed has the largest population?

W. W. HOLDEN:—St. Louis.

CHAIRMAN WILSON:—Is there any other comment? (There was no response.)

If not, we will pass to the report of the committee on The Equipment, which will be presented by Mr. Frank L. Butler in the absence of the chairman, Mr. L. C. Datz. Mr. Butler!

[Mr. Butler then abstracted the report which is printed in full as follows:]

REPORT OF THE COMMITTEE ON THE EQUIPMENT

To the American Electric Railway Transportation and Traffic Association:

GENTLEMEN: The Committee on The Equipment has considered the subjects assigned and presents a report of the year's activities.

Subject Assignments

The assignment to this Committee was subdivided under three headings, as follows:

- (1) Effect on revenues and operating expenses of new and rehabilitated cars.
- (2) Size, type and character of units most suitable for various classes of service.
- (3) Accessories necessary for the safe and convenient operation of buses and trolley buses.

Previous Consideration

This is the second consecutive year that the subject of "The Equipment" was assigned to a committee of the Transportation and Traffic Association. The comfort and convenience of cars have been previously reported upon by the Equipment Committee of the Engineering Association in 1926, and by Rolling Stock Committee No. 3, Car Equipment, in 1927. Consideration of the vehicle, both street car and bus, from the point of view of the comfort and convenience of the customer, its ability to create rider appeal and its ability to meet traffic requirements was reported upon by last year's Committee. It also reported on a practical method of determining upon a few sizes and types of uniform vehicles so as to permit manufacturing on a production basis to effect decreased cost of equipment to the purchaser, a method of analyzing operating results by lines, and a method of determining the economic size of vehicles for various classes of service.

SUBJECT NO. 1.—EFFECT ON REVENUE AND OPERATING EXPENSES OF NEW OR REHABILITATED CARS

During the 1925 Convention of the American Electric Railway Association, a conference of electric railway officials and manufacturers was held to discuss the problem of modernization of equipment. It was generally agreed that the replacement of older type of cars with new, light weight, high speed, modern cars was in most instances highly essential to the stimulation of traffic, and to the reduction of operating and maintenance expenses.

As a result of the conference the Executive Committee of the A.E.R.A. later authorized the formation of a Committee on Essential Features of Modern Cars. That Committee in analyzing its assignment decided that its efforts should be directed toward three important studies of which the second was "The presentation of data and information showing the actual benefits received from the installation of modern rolling stock in various cases." The report of the above Committee was published in the 1926 Proceedings of the American Association.

Subject (1) naturally divides itself into two parts: first, the effect on revenue; second, the effect on maintenance and operation accounts.

Effect of new or rehabilitated cars on passenger revenue

Street railway patronage in common with other businesses, is affected by general economic conditions, including the local employment situation, weather, general business conditions throughout the country and especially in the immediate vicinity of the railway company.

Notwithstanding that the above factors may be controlling in any one specific case, attractive, modern cars tend to increase street railway patronage. This conclusion is reached only after a careful study of the data submitted by the Committee on Essential Features of Modern Cars, an analysis of the operating results of 41 companies that have purchased new cars in recent years, compared with 40 other companies that have not purchased new equipment. Recent data secured by this Committee show very definitely the beneficial effect on revenue of operating new or rehabilitated cars.

In some cases that came under the observation of the Committee, lines operated by new cars showed a higher percentage of increased revenue than the system as a whole, and in other cases where there was a decrease in patronage the percentage of decrease on lines with new cars was less than the percentage of decrease of the entire system.

The facts developed by a study of individual cases where new cars were substituted for older equipment, taken in connection with the general comparison of the 41 companies that have purchased new equipment, with 40 other companies which have not, admits of but one conclusion, namely, *new cars or cars that have been modernized increase passenger revenue by an appreciable per cent.* The extent of modernization or whether or not cars are too old to warrant the cost of rehabilitation are questions beyond the scope of this Committee. The Committee hopes however that the facts developed by its activities will be of assistance to operators and executives in justifying the purchase of new cars or the rehabilitation of older equipment.

Comparison of operating statistics of 41 companies that have purchased new cars during recent years with 40 other companies that have not procured new equipment shows:

COMPANIES PURCHASING NEW CARS

	1928	1927	Per Cent Increase or Decrease
Operating revenue	\$282,850,910	\$284,169,950	D. 0.46
Operating expenses	208,087,100	211,372,280	D. 1.55
Net operating revenue.....	\$74,763,810	\$72,797,670	I. 2.58
Operating ratio	73.57	74.38	D. 1.08

COMPANIES NOT PURCHASING NEW CARS

	1928	1927	Per cent Increase or Decrease
Operating revenue	\$294,503,969	\$304,869,986	D. 3.40
Operating expenses	225,028,553	231,368,989	D. 2.74
Net operating revenue	\$69,475,416	\$73,500,997	D. 5.47
Operating ratio	76.49	75.85	I. 0.84

The above comparison indicates that companies with modern equipment have been able to hold down their loss in revenue to less than ½ of 1 per cent, while other companies suffered a loss in revenue of 3.4 per cent. Also, that the former companies have increased their net operat-

ing revenue by 2.58 per cent as against a decrease by the latter companies of 5.47 per cent. While both classes reduced operating expenses, the higher percentage of decrease by companies without modern cars probably shows that they found it necessary to curtail service to a larger extent due to a greater loss in patronage.

The foregoing comparison gives operating results accomplished by a very large number of different companies throughout the railway industry and these results are of course general in character.

To get a more definite idea of the percentage of increase that can be expected, consideration will be given to a few specific cases where new cars were placed on an individual line of a system and the percentage of increase received from this line for a certain period immediately after the change-over with the same period of the previous year was noted and compared with the revenue from the *system* for the same periods.

In presenting the following statistics the Committee has endeavored to select cases where the effect on riding from extraneous causes was a minimum and whatever effect is shown is due almost wholly to the change from old to new equipment.

CASE NO. 1

Route 21

Line looping in city and extending out 3.558 miles to residence section of medium priced homes. Original equipment consisted of 5 single truck 28-passenger cars and 5 double truck 40-passenger cars, both two-man cars. Equipment replaced by 10 48-seat one-man cars.

TOTAL PASSENGERS

Month	Route 21		System	
	1926	1925	1926	1925
April	193,082	190,930	8,261,511	8,425,387
May	198,338	192,612	8,576,935	8,460,402
June	183,239	183,876	7,872,678	7,966,011
Total	574,659	567,418	24,721,124	24,860,790

Increase 7,241 or 1.28 per cent. Decrease 139,666 or 0.52 per cent.

PASSENGER REVENUE

	Route 21		System	
	1926	1925	1926	1925
Three months	\$30,902.49	\$30,696.96	\$1,313,992.35	\$1,340,748.47

Increase 205.53 or 0.67 per cent. Decrease 26,756.12 or 1.91 per cent.

If the percentage of decrease of the system revenue had applied to this line there would have been a decrease of \$586.31 for the three months; instead, the line revenue increased \$205.53 or a gain of \$791.84 for the quarter. This is at the rate of \$3,167.36 per annum or 2.18 per cent of the \$145,000.00 invested in new cars for the line.

CASE NO. 2

Route 23

A long interurban line looping in center of city and extending out through high class residential properties.

Equipment before and after change-over.

	<i>A. M.</i>	<i>Mid-day</i>	<i>P. M.</i>	<i>Night</i>
No. of cars, 1926.....	12	5	11	5
No. of cars, 1927.....	14	8	11	5

Old cars were double truck, four motor, two-man, 48-seat capacity.

New cars were double truck, four motor, one-man, same capacity.

TOTAL PASSENGERS

<i>Month</i>	<i>Route 23</i>		<i>System</i>	
	<i>1927</i>	<i>1926</i>	<i>1927</i>	<i>1926</i>
March	354,469	334,877	8,384,750	8,228,246
April	352,650	337,802	8,252,646	8,261,511
May	353,285	329,952	8,315,698	8,576,935
Total	1,060,404	1,002,631	24,953,094	25,066,692

Increase 57,773 or 5.76 per cent. Decrease 113,628 or 0.44 per cent.

PASSENGER REVENUE

<i>Month</i>	<i>Route 23</i>		<i>System</i>	
	<i>1927</i>	<i>1926</i>	<i>1927</i>	<i>1926</i>
March	\$19,223.56	\$17,950.69	\$443,472.01	\$439,334.52
April	18,964.67	17,997.01	436,002.15	440,558.37
May	18,836.68	17,622.63	435,971.07	454,919.93
Total	\$57,024.91	\$53,570.33	\$1,315,445.23	\$1,334,812.82

Increase \$3,454.58 or 6.45 per cent. Decrease \$19,367.59 or 1.47 per cent.

CAR MILES

<i>Month</i>				
March	65,017	54,117	1,169,780	1,115,503
April	63,013	52,342	1,138,830	1,087,408
May	64,349	54,112	1,166,780	1,122,467
Total	192,379	160,571	3,475,390	3,325,378

Increase 31,808 or 19.81 per cent. Increase 150,012 or 4.51 per cent.

In this case system passenger revenue decreased 1.47 per cent. Applying this percentage to the revenue from Route 23 would show a loss of \$787.48. Instead of this loss there was a gain of \$3,454.58, or a net difference of \$4,242.06 for the quarter or at the rate of \$16,968.24 per annum—or a rate of return of 8.35 per cent on the investment of \$203,000.00 required for new cars on this line.

This entire gain, however, cannot be attributed to the new equipment as there was a large increase in the amount of service rendered. It is probable, however, that the new equipment attracted additional patronage which justified the improved service, which in turn attracted more riders.

OPERATING RESULTS FROM 20 NEW CARS IN HOUSTON: Late in December, 1927, 20 new type, double-truck, one-man cars were placed in opera-

tion on two lines as shown below. The effect on revenue is very clearly brought out in the statistics below :

	Old Cars 1927	New Cars 1928	Total Increase	Per Cent Increase
<i>Passengers Carried</i>				
M. line	4,679,943	4,931,716	251,773	5.4
S. line	2,669,580	2,971,152	301,572	11.3
Elec. cars system.....	50,302,328	47,169,396	3,132,932 D	6.2 D
<i>Operating Revenue</i>				
M. line	206,698	283,573	22,875	8.8
S. line	149,451	174,504	25,053	16.8
Elec. cars system.....	2,666,251	2,631,555	34,696 D	1.3 D
<i>Revenue Miles</i>				
M. line	719,000	658,331	60,669 D	8.4 D
S. line	472,000	492,294	20,213	4.3
Elec. cars system	7,486,578	6,805,588	680,990 D	9.1 D
<i>Revenue Per Car Mile (Cents)</i>				
M. line	36.8	43.0	6.2	16.8
S. line	31.7	35.5	3.8	12.0
Elec. cars system.....	35.7	38.6	2.9	8.1
<i>Speed M. P. H.</i>				
M. line	8.4	8.9	0.5	6.0
S. line	8.9	9.2	0.3	2.8

For additional data on the subject of the effect of new equipment, reference is made to *Electric Railway Journal* for May, June and July, 1929, and to the report of the Committee on Essential Features of Modern Cars, 1926 Proceedings of the American Association, A. E. R. A.

Effect of New or Rehabilitated Cars on Maintenance and Operating Expense

It was the hope of the Committee that it would be able to show accurately that :

- (1) Operation of light weight, modern cars would show a saving in power.
- (2) New cars would increase schedule speed.
- (3) Operation of modern cars reduce platform costs.
- (4) Maintenance of modern cars would not only be less for the first few years but would remain lower than the old type of cars.
- (5) Lighter cars would show a saving in maintenance of way.
- (6) Safety features of new cars would result in a decrease in accidents.

The above features are generally conceded by the industry, but it develops that a more detailed and comprehensive system of accounting will be necessary on most properties before the extent of the saving can be accurately proven.

This report will therefore necessarily be limited to a discussion of the above subjects and the presentation of data which were prepared in an effort to throw as much light on the subject as possible.

(1) POWER SAVING: There is no argument against the fact that light weight, modern cars with motors of less weight effect a saving in power when used in the same service, and it is not a difficult problem to determine accurately the amount of the saving when car weights, motor equipment, gear ratio, schedule speed, stops per mile and physical characteristics of the route are known. In actual operating practice, however, seldom, if ever, do new cars render the same service. Their higher rate

of acceleration, braking and free running speed is always taken advantage of to increase schedule speeds and render a better service. The result of the faster speeds in most cases results in an increase of power consumption that more than offsets the savings due to light weight and modern motors. This will be brought out in chart (Fig. 1) showing kw-hr. per car mile and schedule speeds.*

(2) SCHEDULE SPEEDS: On any given route where the grades and curvature, average line voltage, average number and length of stops are known, the schedule speed that can be made by different types of cars can be determined. The above conditions being constant, it is only necessary to know the weight of the cars, the number and characteristics of the motors, the gear ratios, and wheel diameters. Modern, light weight cars will show possibilities of increasing schedule speed ranging from 4 per cent up.

Two of the limiting factors in increased speed are allowable rate of acceleration and average length of stops. Multiple point controllers will greatly increase the allowable rate of acceleration without discomfort to passengers, and proper door arrangement will reduce the length of stops. See attached data and graph on car loading efficiency, Fig. 2.

Modern or rehabilitated cars should be designed to take full advantage of these two features.

(3) PLATFORM COSTS: Whenever modern, one-man cars replace older cars of the two-man type the saving in this account alone will return a sufficient percentage of the investment to justify the expenditure. The preceding statement is true in all cases where the new cars can be used on base schedules operating 16 or more hours per day.

In cases where the new cars are used only during the A. M. and P. M. peaks the saving can be determined by knowing the wage rates and the hours of use. In cases where new equipment replaces old equipment of similar type (either one or two man) the new cars with their higher speeds will effect a saving in this account as, after eliminating all bonus guaranteed and extra time, platform costs vary inversely with schedule speeds. An example of the saving effected in this item by one company is illustrated in Fig. 3.

(4) MAINTENANCE: New cars of course show a saving in maintenance for the first few years of their life and it seems to be the opinion of equipment men that maintenance will remain lower throughout their life. This opinion is based on improved methods of lubrication, better materials, and superior general design. Any saving in this account is as yet intangible and modern cars have not reached an age when these opinions can be absolutely substantiated. It is reasonable to assume, however, that operators and the men in the shops and barns will take more pride and interest in new equipment resulting in improved operation and maintenance practices. Note attached chart (Fig. 4) of what has

*Also see article entitled "Complete Car Replacement in Lexington Returns Investment in Five Years," in *Electric Railway Journal* of August 1929, pages 758 to 764.

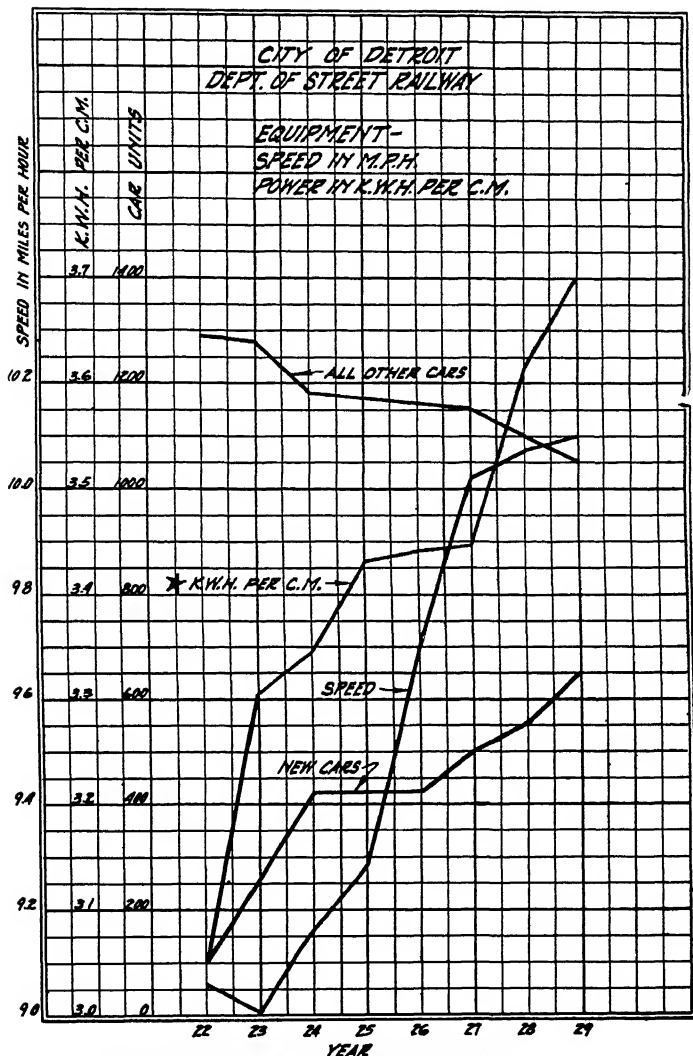


FIG. I.—EFFECT OF NEW EQUIPMENT ON SPEED AND POWER CONSUMPTION

CITY OF DETROIT — DEPARTMENT OF STREET RAILWAYS

SUBJECT: Loading and unloading time of Peter Witt cars.

CONCLUSIONS: (1) Average loading time observed for 40 Peter Witt cars during the rush hour was 0.01172 minutes per passenger or 0.7032 seconds per passenger.

(Data continued on next page)

(2) Average unloading time observed for 40 Peter Witt cars during the rush hour was 0.0120 minutes per passenger or 0.720 seconds per passenger.

Discussion: As a further check on the loading and unloading time of Peter Witt cars a time study was made of eighty cars operating on the Trumbull and Michigan lines. To obtain comparable loads these checks were made at the Fort and Shelby and the Michigan and Griswold intersections.

DETAIL—Date 3-8-29. Fort Street at Shelby: Passengers loaded.

Observation	Passengers Loaded	Time Minutes	Observation	Passengers Loaded	Time Minutes
1.....	24	0.33	11.....	45	0.45
2.....	14	0.21	12.....	35	0.35
3.....	27	0.35	13.....	21	0.23
4.....	18	0.20	14.....	25	0.31
5.....	31	0.41	15.....	37	0.39
6.....	34	0.35	16.....	44	0.50
7.....	37	0.39	17.....	51	0.54
8.....	25	0.20	18.....	31	0.35
9.....	43	0.50	19.....	27	0.25
10.....	20	0.25	20.....	33	0.36

Date: 3-9-29. Michigan at Griswold: Passengers unloaded.

Observation	Passengers Unloaded	Time Minutes	Observation	Passengers Unloaded	Time Minutes
1.....	25	0.29	11.....	38	0.45
2.....	31	0.40	12.....	52	0.65
3.....	40	0.50	13.....	51	0.57
4.....	30	0.35	14.....	46	0.61
5.....	35	0.43	15.....	30	0.38
6.....	29	0.32	16.....	29	0.31
7.....	49	0.60	17.....	23	0.28
8.....	49	0.27	18.....	29	0.32
9.....	33	0.42	19.....	31	0.37
10.....	19	0.26	20.....	37	0.42

Date: 3-11-29. Fort Street at Shelby: Passengers loaded.

Observation	Passengers Loaded	Time Minutes	Observation	Passengers Unloaded	Time Minutes
1.....	66	0.82	11.....	45	0.56
2.....	66	0.80	12.....	76	0.94
3.....	18	0.22	13.....	56	0.64
4.....	57	0.76	14.....	46	0.53
5.....	52	0.56	15.....	66	0.68
6.....	24	0.27	16.....	58	0.82
7.....	37	0.47	17.....	66	0.84
8.....	14	0.19	18.....	38	0.48
9.....	42	0.48	19.....	48	0.57
10.....	45	0.58	20.....	26	0.26

Date: 3-12-29. Michigan at Griswold: Passengers unloaded.

Observation	Passengers Unloaded	Time Minutes	Observation	Passengers Unloaded	Time Minutes
1.....	40	0.48	11.....	52	0.68
2.....	45	0.59	12.....	50	0.58
3.....	29	0.37	13.....	41	0.53
4.....	38	0.45	14.....	56	0.60
5.....	49	0.59	15.....	47	0.56
6.....	33	0.49	16.....	30	0.41
7.....	36	0.41	17.....	49	0.54
8.....	44	0.51	18.....	41	0.49
9.....	51	0.60	19.....	54	0.59
10.....	50	0.60	20.....	22	0.25

SUMMARY:

Total passengers loaded.....	1,568
Total time required for loading.....	18.38 min.
Time required per passenger.....	0.01172 min.
	or 0.7032 seconds.
Total passengers unloaded.....	1,543
Total time required.....	18.52
Time required per passenger.....	0.0120 min.
	or 0.720 seconds.

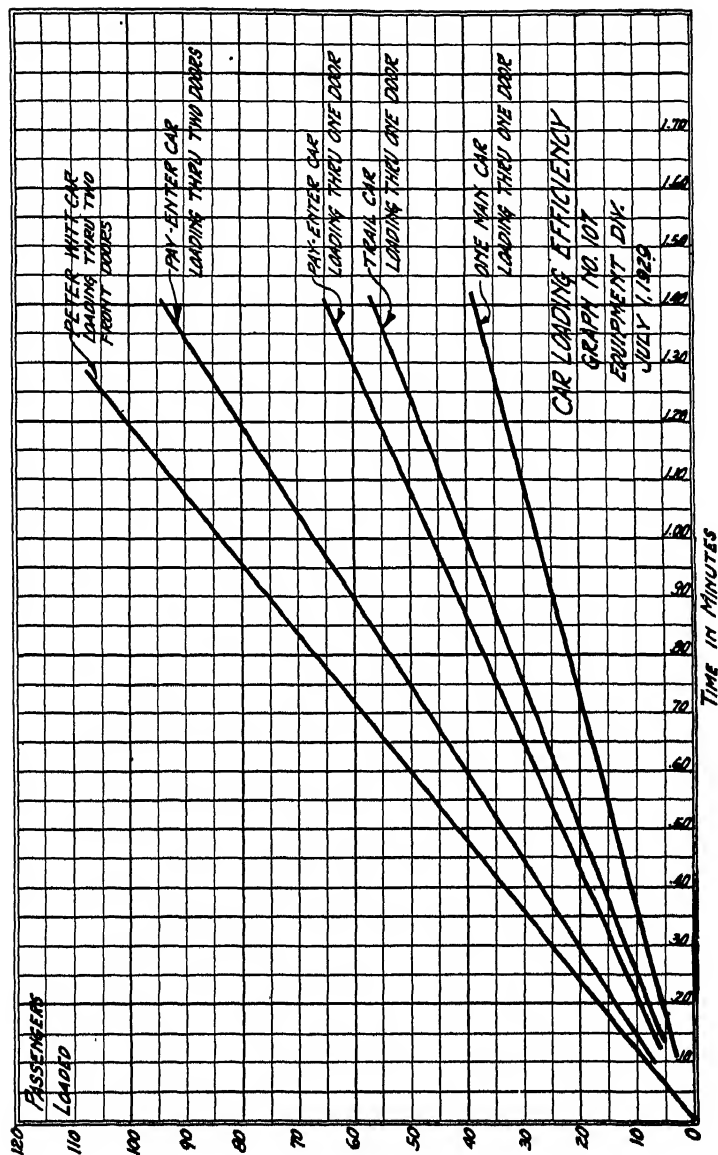


FIG. 2—COMPARISON OF CAR LOADING EFFICIENCIES

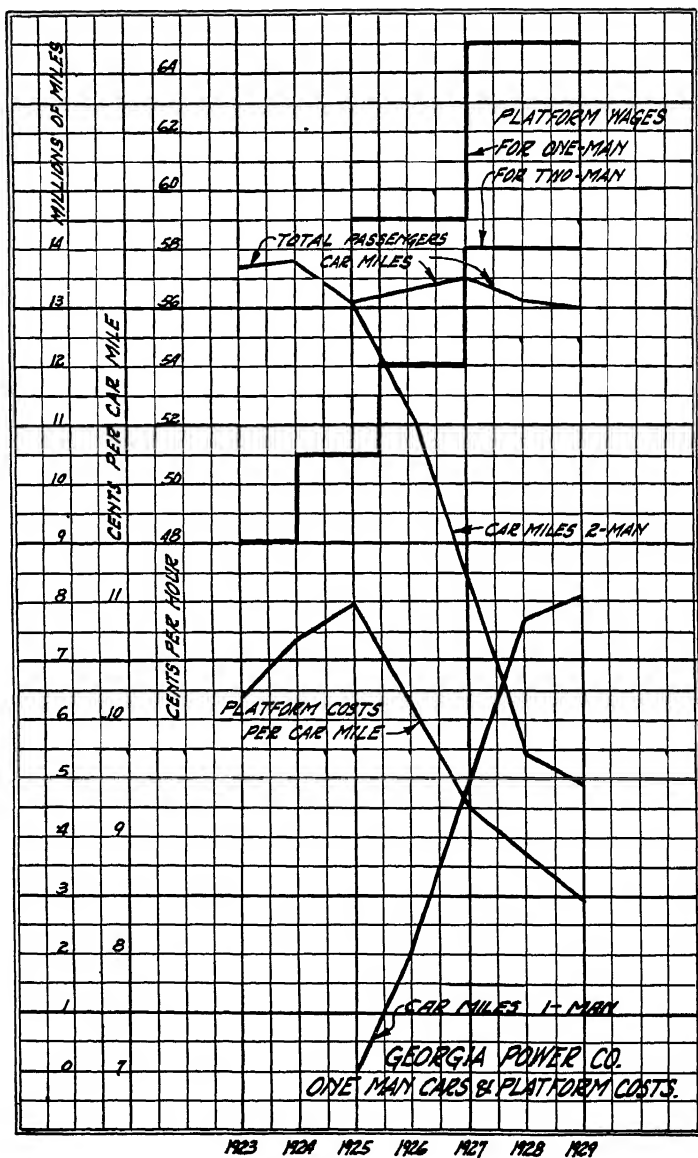


FIG. 3—PLATFORM COST COMPARISONS—ONE-MAN AND TWO-MAN CARS

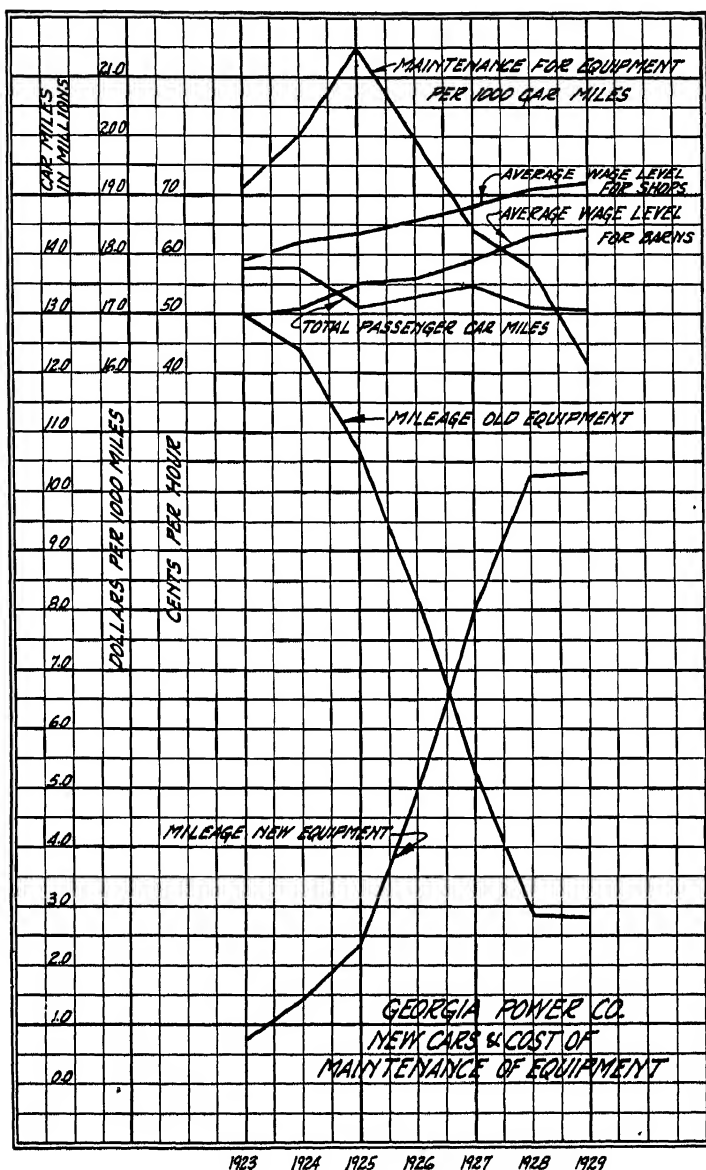


FIG. 4—MAINTENANCE OF EQUIPMENT COST COMPARISONS

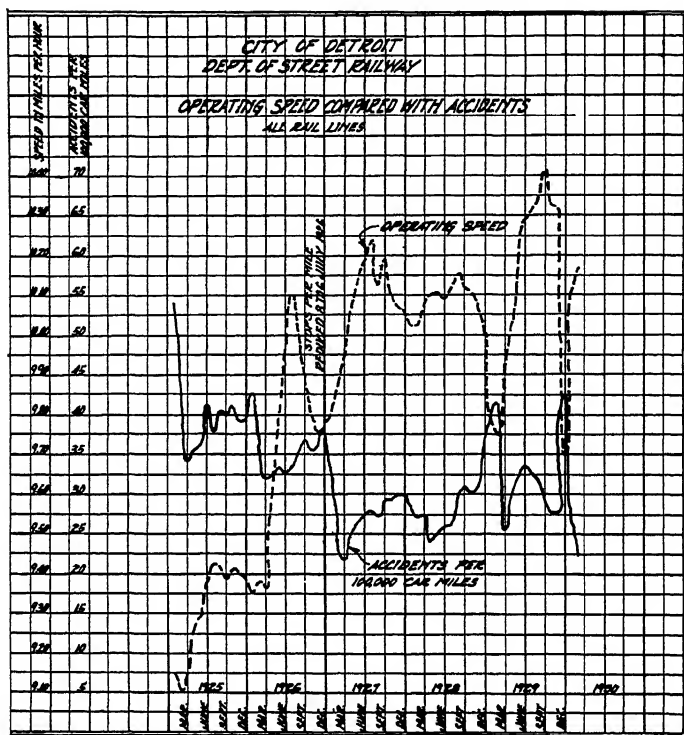


FIG. 5—VARIATION OF ACCIDENTS OCCURRING WITH OPERATING SPEED

been accomplished on one property. In this case the saving in maintenance of equipment is attributed to "the purchase of new cars, the rehabilitation of other cars, the scrapping of the older cars and the rehabilitation of the personnel."

In connection with maintenance of equipment, it might be advisable at this time to call attention to the trend of the industry in eliminating all accessories that are not essential to the safe and proper operation of the vehicle. The simpler the wiring, piping, valves and appurtenances, the larger the savings in this account.

(5) MAINTENANCE OF WAY: The operation of lighter cars certainly results in less wear and tear on special work, rails, and track structure and although this saving is difficult of computation and may not materialize for a few years this fact should have consideration in any estimate of operating costs of new equipment.

(6) SAFETY: During the past few years all street railway companies have engaged in safety work. Remarkable results have been accom-

plished in reducing the number and severity of accidents. That new equipment, with more efficient braking equipment and safety features, has contributed to this end is beyond question but to allocate the percentage of saving that is due to new equipment and the percentage that is a direct result of accident prevention work, is impossible.

Modern cars with low floors and two steps instead of three reduce the number and severity of boarding and alighting accidents. The higher acceleration rates of new cars reduce the possibility of automobile drivers cutting in front of the cars, a practice very conducive to accidents.

In this study one fact was brought out very distinctly, i. e., that increased speeds decrease accidents. Slow schedules allowing the operator or motorman to loaf on the job are conducive to accidents. Faster schedules require the operator's entire attention and keep him alert at all times. This alertness causes him to avoid accidents that otherwise would occur. See chart of Detroit Street Railways on Speeds and Accidents (Fig. 5).

Summary

A replacement or rehabilitation program depends upon the ability to show a satisfactory return on the necessary investment. The study indicates the following:

New cars, one-man type, replacing older two-man cars on base schedules will save in platform expense enough to justify the investment.

In replacements other than complete base schedule local conditions will determine the savings.

In a large majority of these cases the operation of modern equipment will result in an increase in revenue amounting to 2 per cent or more on the investment.

Slight savings can be had in maintenance of way and appreciable savings in maintenance of equipment if accessories are limited to essentials.

Platform costs will show a material reduction if the change includes one-man operation, the amount depending upon platform wage rate, but some reduction will always be obtained depending on the increase in schedule speed and the hours of use.

Decrease in kw-hr. per car mile will be proportionate to the reduction in car weight. Allowance must be made for increased energy requirements for increased schedule speed, electric heat, etc.

Under General Expense there should be a reduction in the injury and damage account, and in insurance costs.

SUBJECT NO. 2—SIZE, TYPE AND CHARACTER OF UNITS MOST SUITABLE FOR VARIOUS CLASSES OF SERVICE

The 1929 report of this Committee showed a simple method of determining the relative costs of operation, including fixed charges on the vehicle investment, for several sizes of cars and buses. The illustrations used, however, were based on a volume of traffic that required much shorter headways than are usual in the majority of medium size cities.

Similar studies are shown herewith, one for a heavy traffic route and one more typical of light traffic. Energy consumption is figured on a

higher basis than in 1929. Calculations indicate that fast city schedules require about 0.2 kw-hr. per ton mile at the a-c. bus, and we assume a price of 1.3 cents per a-c. kw-hr. for power.

The weights and values of cars as shown are considered average, though wide variations, due to local specifications for equipment and for materials, are shown in recent purchases. Only double truck cars have been considered.

Operating schedule speeds, of course, vary tremendously, due to many conditions such as voltage, interference by other traffic, car design, car equipment, grades, length of route, proportion of run in congested section, etc. This, together with varying rates of pay for the platform men, make the advantage of large cars more important in some routes than others.

These studies are, therefore, merely indicative of a method to be used, rather than as predictions of results. On some routes, a more frequent service with small cars will produce much more revenue than on others. We have included some theoretical revenue figures simply to call attention to the fact that a study of revenues as well as operating costs is a part of this problem.

In all cases we have figured on maximum service for 2.5 hours morning and afternoon, or a total of 5 hours daily; on normal service for 13 hours, and on owl service for the other 6 hours in the case of the heavy traffic route in example A.

For the purpose of calculations, 10 per cent of spares have been assumed for both buses and cars, but many properties operate on a smaller percentage, especially in the larger cities. Seasonal load variations may permit as low as 3 per cent to 4 per cent of spares.

COMPARISON OF COSTS ON VARIOUS SIZES OF BUSES

EXAMPLE A

Line Characteristics

Round trip mileage—20.

Round trip time—2 hrs.

Maximum half hour peak A. M. and P. M.—1440 passengers maximum load.

Normal service now handled with cars seating 44 passengers on 3.5 min. headway.

For these calculations we assume standing loads equal to seating capacity.

Seating capacity	35	44	52	60
Maximum capacity	72	88	104	120
Value per car	\$14,300	\$15,600	\$16,200	\$18,300
Weight in tons	13.5	16	18	21
Peak headways (min.)....	1.5	1.8	2.15	2.5
Cars required	80	66	56	48
Miles operated	4,000	3,300	2,800	2,400
Normal headways (min.)..	3 0	3.5	4.0	4.5
Cars required	40	34	30	27
Miles operated	5,200	4,400	3,900	3,500
Owl headways (min.)....	60	60	60	60
Cars required	2	2	2	2
Miles operated	120	120	120	120
Miles per day	9,320	7,820	6,820	6,020
Max. cars operated.....	80	66	56	48
10 per cent spares.....	8	6.6	5.6	4.8
Total cars required.....	88	72.6	61.6	52.8
Investment in cars.....	\$1,265,000	\$1,130,000	\$990,000	\$965,000

Daily Expenses

	36	44	52	60
Seating capacity				
Maint. equip., cents per mile	2.0	2.4	2.7	3.2
Maint. equip., cost per day	\$186.40	\$187.14	\$184.14	\$192.64
Power, cents per car mile	3.5	4.15	4.7	5.45
Power, cost per day	\$326.20	\$324.53	\$320.54	\$328.09
Operators at 7 cents per mile	\$652.40	\$547.40	\$477.40	\$421.40
Interest and depreciation at 12 per cent	\$415.92	\$371.52	\$325.44	\$317.28
Totals per day	\$1,580.92	\$1,431.13	\$1,307.52	\$1,259.41
Possible receipts	\$3,949.00	\$3,910.00	\$3,871.00	\$3,832.00
Balance	\$2,368.00	\$2,479.00	\$2,563.00	\$2,573.00

The larger cars are distinctly more economical in handling a given amount of traffic, provided one-man operation is continued through the peaks. It appears improbable that on the short headways shown differences in riding would offset the economies indicated.

EXAMPLE B

Line Characteristics

Round trip mileage—9.0.
 Round trip time—60 minutes.
 Present cars seat—44.
 Maximum peak—264 passengers per half hour.
 Normal service, 15 min. headway.

Seating capacity	36	44	52	60
Maximum capacity	72	88	104	120
Weight, tons	13.5	16	18	21
Value per unit	\$14,300	\$15,600	\$16,200	\$18,300
A. M. and P. M. peak headways (min.)	7.5	10	10	12
Cars required	8	6	6	5
Miles operated	360	270	270	225
Normal periods headways (min.)	12	15	15	20
Cars required	5	4	4	3
Miles operated	585	468	468	351
Miles per day	945	738	738	576
Max. cars operated	8	6	6	5
Cars required inc. spares	8.8	6.6	6.6	5.5
Investment in cars	\$126,000	\$103,000	\$107,000	\$101,000

Daily Expenses

Maint. Equip. cents per mile ..	2.0	2.4	2.7	3.2
Maint. Equip. cost per day	\$18.90	\$17.70	\$19.95	\$18.40
Power, cents per mile	3.5	4.15	4.7	5.45
Cost per day	\$33.15	\$30.60	\$34.75	\$31.35
Operators, at 7.5 cents	\$70.85	\$55.35	\$55.35	\$43.20
Interest and depreciation at 12 per cent	\$41.40	\$33.86	\$34.16	\$33.20
Totals per day	\$164.30	\$137.51	\$144.21	\$126.15
Revenue per day	\$330.00	\$300.00	\$300.00	\$270.00
Net	\$165.70	\$162.49	\$155.79	\$143.85

While larger cars provide at all hours equal capacity for a lower cost, the loss of revenues through lengthening already long headways would almost certainly result in a net loss. Smaller cars on more frequent headways would probably increase revenues sufficiently to justify their slightly higher operating costs.

EXAMPLE C

Line Characteristics

Round trip mileage—10.0.

Running time round trip—60 minutes.

Maximum service, 5 hours daily.

Normal service, 13 hours daily.

Owl service, 6 hours daily.

Maximum half hour loads, 360.

Normal service with 30 passenger bus, 7.5 minute headways.

For these calculations we assume standing loads one-half of seating capacity.

Seating capacity.....	16	21	30	40
Weights, tons.....	4.0	5	7	9
Value per bus.....	\$4,500	\$5,500	\$9,500	\$11,500
Peak headways (min.).....	2.0	2.5	4.0	5
Buses required.....	30	24	15	12
Miles operated.....	1,500	1,200	750	600
Normal headways.....	4.0	5.0	7.5	10
Buses required.....	15	12	8	6
Miles operated.....	1,750	1,560	1,040	780
Total daily miles.....	3,250	2,670	1,790	1,380
Max. buses required.....	30	24	15	12
10 per cent spares.....	3	2.4	1.5	1.2
Total bus requirements.....	33	26.4	16.5	13.2
Bus investment.....	\$148,500	\$145,000	\$157,000	\$152,000

Daily Expenses

Seating capacity.....	16	21	30	40
Maint. equip. cents per mile..	3.75	4.5	6.5	8.5
Maint. equip. cost per day....	\$121.88	\$124.20	\$116.35	\$117.30
Power gasoline, cents per mile	2.5	3.0	4.0	5.0
Power gasoline, cost per day..	\$81.25	\$82.80	\$71.60	\$69.00
Wages of operators, cents per mile.....	7.0	7.0	7.0	7.0
Wages of operators, cost per day.....	\$227.50	\$193.20	\$125.30	\$96.60
Depreciation at 20 per cent and 13 3 per cent.....	\$81.40	\$79.45	\$57.20	\$55.40
Interest at 6 per cent.....	\$23.86	\$23.56	\$25.80	\$25.00
Totals per day.....	\$535.89	\$503.21	\$396.25	\$363.30
Possible revenue.....	\$590.00	\$580.00	\$537.00	\$510.00
Balance.....	\$54.00	\$77.00	\$141.00	\$147.00

NOTE: Those accounts not affected have been omitted. Depreciation on the smaller size buses has been figured on a five year life; for the larger and more durable types, on a 7.5 year basis.

Schedule speed might be higher for small buses, due to fewer stops and this should be considered.

In the above, as in the figures on cars, the use of larger buses on longer headways, to provide an equivalent number of seats per hour, is the more economical, so far as costs are concerned. As in the case of rail service, however, it becomes necessary to balance the savings in operation and in fixed charges against the possible effect of increased riding resulting from shorter headways. Even so, the larger buses appear to have the advantage in net income.

While trolley buses should have a lower cost for power, and probably a lower maintenance than gas engined buses, we believe that the same conclusions as to size would apply to this type. Larger sizes will be more economical to operate so far as costs per seat mile are concerned. Larger capacity units are preferable for heavy lines.

If the larger capacity cars be used during the rush hours only, and the same headways, 3 minutes, maintained by all sizes throughout the

balance of the day, the 52 seat car becomes the most economical. Applied to example A, the results are:

Seating capacity	36	44	52	60
Miles per day	9,320	8,620	8,120	7,720
Maint. power and platform, per mile, cents	12.5	13.55	14.4	15.65
Maint. power and platform, per day	\$1,165.00	\$1,168.01	\$1,169.28	\$1,208.18
Int. and depreciation	415.92	371.52	325.44	317.28
Totals	\$1,580.92	\$1,539.53	\$1,494.72	\$1,525.46

It is fairly certain that no additional revenue would be obtained by the shorter rush hour headways of the smaller size units.

A similar application in example B, varying rush hour headways with the size of car but keeping 12 minute headways the remainder of the day, results as follows:

Seating capacity	36	44	52	60
Miles per day	945	855	855	810
Maint. power and platform, per mile, cents	13.0	14.05	14.9	16.15
Maint. power and platform, per day	\$122.85	\$120.13	\$127.40	\$130.82
Int. and depreciation	41.40	33.86	34.16	33.20
Totals	\$164.25	\$153.99	\$161.56	\$164.02

Here, on fairly long headways, there is little to choose between the various sizes so far as operating economy is concerned, but the shorter rush hour headways of the small units, 7.5 minutes as compared to 10 to 12 minutes, would tend to increase riding.

Similarly, in the case of buses, if headways to be operated through normal periods were kept to 5 minutes for the 3 larger types in the example shown, the relative costs are as follows:

Seating capacity	16	21	30	40
Miles per day	3,250	2,760	2,310	2,160
Maint. power and platform, per miles, cents	13.25	14.5	17.5	20.5
Maint. power and platform, per day	\$430.63	\$400.20	\$404.25	\$442.80

EXAMPLE D—CARS VS. BUSES

Line Characteristics

(Same as Example A)

Round trip mileage 20; round trip time 2 hours.
Maximum half hour peak, 1,440 passengers.

	Cars		Buses	
Seating capacity	52	60	30	40
Maximum capacity	104	120	45	60
Peak headways (min.)	2.15	2.5	1.0	1.25
Vehicles required	56	48	120	96
Miles operated	2,800	2,400	6,000	4,800
Normal headways (min.)	4.0	4.6	2.3	3.1
Vehicles required	30	26	52	39
Miles operated	3,900	3,380	6,760	5,070
Owl headways (min.)	60	60	60	60
Vehicles required	2	2	2	2
Miles operated	120	120	120	120
Total miles per day	6,820	5,900	12,880	9,990
Max. vehicles operated	56	48	120	96
Spares	4	3	12	10
Total required	60	51	132	106
Investment	\$972,000	\$933,000	\$1,254,000	\$1,219,000

Daily Expenses

Power and maint., cents per mile	7.4	8.65	10.5	13.5
Power and maint., cost per day	\$504.68	\$510.35	\$1,352.40	\$1,348.65
Operators, cost per day.....	477.40	413.00	901.60	699.30
Depreciation and interest. . .	319.56	306.74	663.07	644.53
Totals ..	\$1,301.64	\$1,230.09	\$2,917.07	\$2,692.48

The saving by rail car operation, 60 passenger cars compared with 40 passenger buses, amounts to over \$500,000 per year, or \$50,000 per route mile. There could be no question here but that rail service is the more economical.

EXAMPLE E—CARS VS. BUSES

Line Characteristics

(Same as Example C)

Round trip mileage 10; round trip time 60 minutes.
Maximum half hour load, 360 passengers.

	Cars		Buses	
Seating capacity	36	44	30	40
Maximum capacity	72	88	45	60
Peak headways (min.).....	6	7.5	4	5
Vehicles required	10	8	15	12
Miles operated	500	400	750	600
Normal headways (min.).....	7.5	10	7.5	10
Vehicles required	9	6	8	6
Miles operated	1,040	780	1,040	780
Total miles per day.....	1,540	1,180	1,790	1,380
Max. vehicles operated.....	10	8	15	12
Spares.....	0.6	0.8	1.5	1.2
Total required	10.6	8.8	16.5	13.2
Investment	\$151,500	\$137,000	\$157,000	\$152,000

Daily Expenses

Power and Maint., cents per mile	5.5	6.55	10.5	13.5
Power and Maint., cost per day	\$84.70	\$77.29	\$187.95	\$186.30
Operators, cost per day.....	107.80	82.60	125.30	96.60
Depreciation and interest.....	49.81	45.07	83.02	80.37
Totals	\$242.31	\$204.96	\$396.27	\$363.27
Possible revenue	507.00	468.00	537.00	492.00
Balance	\$265.69	\$263.04	\$140.73	\$128.73

Here the rail cars show operating savings of more than \$50,000 per year, and net economies assuring increased riding, due to more frequent service, of about \$45,000 per year, or \$9,000 to \$10,000 per route mile. This warrants retaining rail service until major replacements of track and paving are necessary, and possibly justifies complete rebuilding of track.

SUBJECT NO. 3—ACCESSORIES NECESSARY FOR THE SAFE AND CONVENIENT OPERATION OF BUSES AND TROLLEY BUSES

The 1929 Committee on The Equipment considered the subject of facilities that should be provided on modern or rehabilitated bus equipment to provide the comfort and convenience required by passengers.

The report of the Committee is printed in the 1929 Proceedings of the Transportation and Traffic Association. Section C of that report is headed, "Recommended Design, Principles and Details for Buses." The section is to be found on page 86. After calling attention to the fact that street cars and buses for city service have many things in common and that the desirable features for the future street car apply equally well, in principle, to the future bus, although with certain exceptions, there follows a brief discussion of the subject of the heating and ventilation of buses.

The original way of heating buses by running exhaust pipes through the body has never been entirely satisfactory, and the use of this method is rapidly disappearing. In place of this, some use has been made of a radiator in the exhaust pipe system installed in the body of the bus, across which air is circulated and the hot air blown into the bus body by means of electric fans. This is a decided improvement, but still has many of the objections to the old system and the use of a fan constitutes an additional drain on the battery.

Another method now in use derives its heat from the hot water in the engine cooling system. The hot water is brought into the bus body through a small radiator and the air is blown across the radiator and into the bus body by means of an electric fan. This device can be installed in one or more units. This method removes the objections inherent in the present exhaust gas systems, but it has other objections. It necessitates careful control of the cooling system temperature. This is usually obtained by a thermostatically controlled radiator shutter, or better by a manually controlled radiator shutter, with thermostatic indicator of water temperature on the dash. One of the principal objections of this system is the possibility of abuse by the operator, causing possible overheating of the engine and under certain conditions there may not be sufficient heat available to maintain proper temperatures in the bus body, and the fan causes an additional drain on the battery. It is also necessary to carefully guard against water leaks.

A new method now being tried out employs an independent hot water or steam heating system which derives its heat from the exhaust gases; this seems to have many advantages over the above mentioned systems.

One of these recent systems now in course of development employs low pressure steam produced by utilizing the heat of the exhaust gases and this steam is conducted by a special heater pipe installed in the body of the vehicle through which the steam is continually circulated, the temperature being regulated by control valves in the ordinary manner. This method of heating has been under test on several properties during the past winter. No definite data regarding results were available to the Committee. It is understood that the progress has been very encouraging. It does not employ a fan or other moving parts. It eliminates many of the objections of the former methods employing exhaust gas heat but it uses for its source of heat what would otherwise be a wasted product.

It is recommended that the subject be referred to the Engineering Association for consideration by Rolling Stock Committee No. 2, with the request that it endeavor to perfect the engineering details of the independent hot water, or steam heating systems.

Ventilation is of equal importance. It is recommended that this subject also be referred to the Engineering Association for consideration by Rolling Stock Committee No. 2.

For trolley buses the heating and ventilation are much simpler. There are no noxious gases of the vehicle itself to be guarded against, and heat is usually supplied by the same type of electric heaters used in street cars.

There are a number of other items required for safe and convenient operation of buses and trolley buses that should be given further study. Only a very cursory consideration by this Committee has been given.

Mirrors are required to give the operator vision inside the bus and to observe following vehicles. At least one inside mirror is now standard equipment. Some operators are using two, one reflecting down the aisle and the other reflecting over the heads of the seated passengers on the right side of the vehicle. An outside mirror on the left side of the vehicle is sometimes used.

A more rugged type of wind shield wiper is desirable. An air operated wiper seems most desirable when compressed air is available, otherwise the vacuum type of wiper is usually preferred.

Sleet or ice conditions interfere with the operation of all the wind shield wipers. A simple and practical way to prevent sleet and ice formation on windshields is by the deflection of hot air from under the engine hood cover against the outside of the windshield. This method has been successfully used by merely blocking up the rear end of the hood cover with wooden wedges. Conveniently operated louvres should be provided for this purpose. This method is quite practical and most economical.

There should be a place in the bus body for fire extinguishers. A space adjacent to the front service door should be incorporated in the body itself as part of the standard design.

Operating companies, body and accessory manufacturers must develop these and other important details as part of the standard body design. Accessories designed for pleasure cars are not satisfactory for the hard usage and large mileage incident to bus operation.

Conclusions

(1) Notwithstanding the fact that the street railway business, in common with other businesses, is affected by general economic conditions, attractive, modern cars do tend to increase street railway patronage, and generally result in increased revenue and decreased operating costs.

(2) The number of sizes of cars and buses should be limited and the industry should standardize on a minimum number of sizes of each.

(3) Standard heating and ventilating systems and standard accessories should be developed as parts of body design.

Recommendations

It is recommended that the Committee on The Equipment be continued, and that next year's assignments include:

(1) A further review of operating results from the substitution of modernized vehicles.

(2) A further consideration to limiting the number of sizes of cars and buses herein recommended, and the number of sizes and types of vehicles best suited for various classes of service.

(3) Heating and ventilating of buses and standardization of accessories be referred to the Engineering Association with the request that its Rolling Stock Committee No. 2, study and perfect the engineering details.

Respectfully submitted,

H. H. ADAMS,
R. J. BENNETT,
V. W. BERRY,
H. H. DARTT,
L. J. DE LAMARTER,
W. R. McRAE,
M. G. MOORE,
T. W. NOONAN,
E. A. PALMER,
E. J. ROCHE,
TERANCE SCULLIN,
ALEXANDER SHAPIRO,
DEL A. SMITH,
C. W. STOCKS,
C. H. STRONG,
J. C. THIRLWALL,
A. T. WARNER,
P. J. WOOD,
L. C. DATZ, *Chairman*,
ADRIAN HUGHES, JR., *Sponsor*,
Committee on The Equipment.

FRANK L. BUTLER:—One of the men in my organization served on the committee and he has discussed its various activities with me. I think that the conclusions this committee has arrived at are very interesting and will be very valuable to any one trying to replace old equipment with new. There must be many factors entering into it, of course, to make a real showing, but there is no question but that new equipment can be justified.

CHAIRMAN WILSON:—I will ask Mr. C. E. Morgan, president of the Cincinnati Car Corporation, to discuss the report.

C. E. MORGAN:—I will be frank with you and say I have been vaccinated recently as a car builder, but it hasn't taken yet. After serving so many years in the operating field I have to admit that I consider anything having to do with transportation equipment from that viewpoint and, with your permission, I am going to digress a little from this report before I take it up, and get back to the study of your market.

I am heartily in accord with the statement made by Mr. Holden in referring to the Presidents' Conference Committee which was recently appointed by the Advisory Council and approved by the Association generally, in the work of which the operators and manufacturers are cooperating.

Before we design and build our vehicle, regardless of its type, we should first know our market.

The car company which I have the honor of representing recently completed a market survey of the transportation industry it served, this survey having to do with the market for the product of our plant, which, as you know, consists of various types of vehicles used in the transportation field, especially the field covered by the activity of this Association. This survey was made by a company experienced in making market surveys for various industries and expert in sales promotion and advertising. It entered the work of making the survey admitting that it did not know anything about the transportation business, but tackling it on the basis of the commodity being sold; namely, transportation and the production of the proper vehicle and the service through which the rides were sold.

The survey is quite voluminous and, to say the least, highly interesting, as it deals largely with the consumer market, the consumer being the car rider, the one who uses our service. It covers many cities, in each of which the company's representatives personally went into the homes interviewing the occupants with respect to various phases of transportation in the respective communities. They also interviewed the principal financial or banking houses, officials of the transportation industry and many others. Classifying the types of homes visited, they placed them in three groups based on the yearly earning of the head of the house: first, the poor earning group, second, the fair earning group, and third, the good earning

group; later sub-dividing them into the home owning one or more automobiles, and those without an automobile; and still further giving the weighted average for all homes. One question I remember was whether the service in the respective city rendered by the company was satisfactory. Fifty-six per cent of the "auto" home owners stated it was satisfactory, but to get the real meat of the report you should read the answers made by the remaining 44 per cent. Time will not permit a full discussion of this report, but I mention it to indicate that we should first make a thorough study of our consumer market. When you do, you will find, particularly during the non-rush or off-peak hours, that approximately 86 per cent of your patrons are the women of the family, this being largely due to the father or the son taking the automobile to go to business.

It is the purpose of the Presidents' Conference Committee to make certain studies and then develop a noiseless car or a vehicle of minimum weight; one that can keep its place in tomorrow's traffic and that can be economically operated and retired within a comparatively short period compared with present day practice. But I am satisfied, from my personal experience, that before any such car or vehicle can be designed, before a fair start can be made on the development of this vehicle, it will be necessary to make a thorough study of the market in many cities.

Anything that can be sold can be manufactured and this applies to selling more car rides, but you must first make your market analysis in order to determine how you are going to sell the ride and better serve the public. In this connection, I will refer to the experience of the Brooklyn City Railroad Company.

New cars for Brooklyn were purchased in 1919 and delivered in the early spring of 1920, and additional car purchases were made in cycles of about each two years thereafter. With the earlier purchases we did not make any market survey prior to placing the order for these cars, although we cooperated with the car builders in designing the cars and availed ourselves of the best designs used in many cities up to that time. It is with regret therefore that I say now that some of these cars put in service in 1920 were taken out of service shortly after being received because they did not adequately fit the service for

which they were intended. While calling on the Transit Commissioner in New York, he asked me, "Did you ever think of taking up with your riding public what they desired in the form of a street car?" After leaving the Commissioner's office, we gave considerable thought to that question, as we were at that time considering the purchase of additional cars, and were actively engaged in developing a new and better designed car. We decided then to make an analysis of the consumer market. We did this by interviewing the people in their homes, on the cars, and various other places, doing most of this work through our own organization with selected men. We did, however, take on some outside help and to further check some of the reports, the officers, including myself, joined in the work without acquainting the ones being interviewed as to our position with the company. As a result of securing the viewpoint of the so-called car rider, we found that the car that we had intended purchasing was not the car required to satisfactorily serve our patrons. At that time we were considering purchasing 500 cars but, in view of the information obtained from our patrons, we ordered only 200, incorporating in these many of the changes suggested by the car riders. After receiving these cars and again checking with our riding public, we purchased another 335 cars. Although these were somewhat similar to the first 200, they were different in many ways and were more satisfactory to the car rider. We, therefore, at considerable expense, changed the original 200 to be the same as the 335 cars last purchased. After this was done the car riding public suggested other changes to us and following a further check on the consumer market a still more recent lot of cars purchased have been redesigned and are a material improvement over the preceding lot.

I want to say frankly that when we took this to our public, they gave us many problems that never occurred to us, and it was some job to take care of these matters and put them into car design.

The previous committee, in studying this subject, dealt with comfort. Likewise, this committee has dealt with the same thing and also safety and sales appeal; but, to my mind, there is one thing that has been overlooked that is very important.

We have studied light weight, rapid acceleration and deceleration, but we have apparently overlooked the proper laying out of the car as to passenger control, location of entrance and exit doors and particularly to the layout of the seating and aisles. In the larger cities the major purchases were cars of the type known as the front entrance, center exit. If you will check up the operation of this type of car, with double passageway doors in front, and double passageway exit doors in the center, you will find the efficiency of this car is approximately 82 per cent due to the improper location of the exit doors and the layout of the seating and aisles.

I, personally, have had numerous discussions with Mr. Peter Witt, whose name has since become attached to this type of car, due to his holding patents covering the location of the conductor in this type of car. I disagree with him as to the location of the conductor. I refer particularly to a car operated by two men, a motorman and a conductor.

With a few exceptions, it has been the general practice to place the conductor on the right hand side of the car (determined when seated in the car looking forward towards the front end), immediately in front of the center exit doors. This places the conductor so that he faces the aisle and with his left side next to the center exit doors and from this position he supervises the collection of fares and the operation of the exit doors. Mr. Witt's argument is that placing the conductor on this side adjacent to the doors permits him to control the doors, takes him out of the aisle and eliminates any apparent obstruction to the flow of passengers through the car when they are moving towards the rear end of the car. That part is correct, for the reason it has been found if there is the slightest obstruction in the aisles the passengers remain in the front part of the car, particularly if this condition is aggravated by a narrow aisle in the rear half of the car. If the conductor is placed on the opposite or left hand side of the car and his fare box so located with respect to the entrance doors, that the doors will come within his vision while supervising fare collections, he has a better supervision of the doors without distracting his attention from the fare collection. Where this type car has been changed or constructed to place the conductor in the latter location, the

change has usually resulted in a material increase in revenue, with fewer alighting accidents.

Considering the design of this type of car, we have not given proper consideration to the location of the exit doors, usually placing them in the center of the car, thus dividing the car instead of the passenger load. We have not considered the space at the front as being occupied by the motorman and the controls, and if you will check the area available to passengers, comparing the front section with the rear section in this respect, you will find that the latter is the larger area. We usually attempt, however, to put as many transverse seats as possible in the rear section, with a resultant narrow aisle in the rear half. This produces serious congestion in the front half of the car, and at peak traffic hours, the extreme rear of the car does not get its share of the passengers, while in the front half, the motorman is unable to pick up all prospective passengers due to the crowding around the front entrance doors. If the exit doors were moved slightly to the rear of the center of the car, thus dividing the passenger load, and more thought given to providing better circulation of passengers within the car, a material saving in time would result at each stop and a general speeding up of the service would be obtained. A further check of the service of such improperly laid out cars shows the over-all efficiency of the car to be reduced from 15 to 20 per cent, and in order to provide proper service it is necessary to add more cars resulting in additional operating costs which would ordinarily be saved if the cars were made so that all space could be utilized.

I believe we will all agree that if the average company could only obtain one more passenger per trip each day, in addition to those now carried, it would help materially in widening the margin between the income and the operating expense, for just one more passenger per trip means hundreds of thousands of dollars for the operating company in the average city.

In Chicago they are doing a worthy thing. I believe I am correct when I say that in one of their latest cars, having the three passenger way entrance at the front and one single and one double passageway center exit, they have closed up the

single passageway exit, retained the double passageway at the center and installed a single passageway, treadle operated exit, at the rear end of the car, thus changing the car into a front entrance, center and rear exit, car. I think this is a move in the right direction and will result in the speeding up of the service and making it more satisfactory to the car rider.

Again referring to the location of the conductor if you will check up the manner in which the passenger pays, you will find that approximately 90 per cent of the passengers deposit the coin with the right hand, and when you place the farebox to the left, it causes the passenger to turn slightly in order to bring his right arm around in front of him. This causes a further slowing down of the passengers within the car and this slow movement is quite serious during the peak hours of traffic.

Referring further to the necessity of studying the market and finding out what the consumer wants, after the cars have been placed in service I highly recommend that studies be made of the traffic conditions of each individual line and not of the system as a whole.

Generally speaking, the traffic demands made on the system are very similar over all lines, but a closer study will show that the traffic demands and service on each line are different enough to warrant making an individual study of it and that the system, as a whole, will be benefited thereby. It is somewhat like the old saying, "Watch the pennies and the dollars will take care of themselves."

I fully concur in the recommendation of this committee and particularly that of Mr. Holden, that this work should be carried on and particularly that being undertaken by the Presidents' Conference Committee. I am quite sure that before they get very far, they will stop, look and listen until they get the market survey and then we will start to build a car that will be ultimate.

CHAIRMAN WILSON :—We would also like to hear from Mr. F. E. Geibel, Assistant Superintendent of Equipment, Pacific Electric Railway Company, of Los Angeles.

F. E. GEIBEL :—The trend of discussion at this convention is very definitely for a more attractive service. Many companies

have spent, and are still spending, considerable sums for new or reconditioned equipment as the basis for this attractiveness. Some two years ago the Pacific Electric installed new seats of the deep cushion type in 44 interurban cars and at the same time closed in the open sections. On another lot of 100 cars the open sections were closed in and wood slat seats were replaced with the upholstered seats of the older type. Much favorable comment has come regarding these improvements, particularly the closing in of the open sections, which in former years were popular. The seats cost considerably more than closing in, but the question arises as to which attracted more business. The company now has on order 15 of the modern one-man two-man type of cars to be operated in two different communities. In one locality there may be some travel attracted by new equipment. In the other, however, the chief benefit will be one of less operating cost with the one-man operation.

The item of operating costs has been touched upon in the report and we have reason to believe that the modern equipment will be less expensive to maintain. In securing the speed, comfort and less noise that appears to be desirable, there are elements of cost, both first and operative, that warrant further study. There seems to be no question but that speedy service is attractive, but just how much are we to spend on comfort and noise reduction, particularly on a rehabilitation program? The Pacific Electric has made some experiments with noise elimination, but no definite program has been started except on what might be termed unnecessary noises, which can be eliminated by better maintenance. It is suggested that the committee develop some relative values for speed, comfort and noise reduction as a rider appeal.

The comparisons on car and bus sizes are very interesting. One of the big factors is the estimated growth in population in the territory served. The question of bus sizes is just now a problem with the Pacific Electric in communities which are increasing at the rate of 10 per cent per year. Buses, of course, are more easily switched around than cars.

A point that should not be overlooked is that of the effect of new equipment on employees. Any improvement in the

equipment or in the property as a whole will develop employee interest. Too frequently, however, the employee is not given sufficient information to arouse this interest. For the shop man I recommend such statistics and information as will let him know whether the equipment furnished is doing the job.

CHAIRMAN WILSON:—If there are no other comments or questions regarding the report of this committee, I shall ask Mr. Morgan to take the chair to conduct the installation of the new officers.

C. E. MORGAN:—Our friend and retiring President, Sam Riddle, unfortunately could not be here today and we have the Past President's Badge to be presented to him. In that case we will have to take it back east and pin it on him with honors, in Louisville.

The Transportation and Traffic Association and its members are very fortunate in having, as its new President, Mr. Paul E. Wilson. I am quite sure he requires no introduction, and I take great pleasure in presenting to you our new President, Mr. Wilson! [Applause.]

[President-elect Paul E. Wilson then acknowledged the applause and made a few brief announcements.]

PRESIDENT-ELECT WILSON:—Gentlemen, if there is no further business to come before the meeting, this convention is adjourned.

[The convention adjourned at 12:05 P. M.]

CONTRIBUTORS TO DISCUSSIONS

(Arranged Alphabetically According to Names)

The following is a complete list of the names, official titles and addresses of those who participated in the discussions at the Convention of the Transportation and Traffic Association

George B. Anderson, Los Angeles Railway, Los Angeles, Cal.

Jeff L. Alexander, Manager, Houston Electric Company, Houston, Texas.

Maxwell E. Benson, Adv. Manager, Nashville Railway and Light Co., Nashville, Tenn.

A. C. Bradley, Superintendent Northern Division, Pacific Electric Railway Co., Los Angeles, Cal.

F. L. Butler, Vice-President, Georgia Power Company, Atlanta, Ga.

Fred H. Chesnut, Transportation Engineer, The White Company, San Francisco, Cal.

W. N. Clark, Vice-President and General Manager, Southern Colorado Power Company, Pueblo, Colo.

C. H. Evenson, Superintendent of Transportation, Chicago Surface Lines, Chicago, Ill.

E. W. Florence, Division Manager, Pacific Gas & Electric Company, Sacramento, Cal.

F. E. Geibel, Assistant Superintendent Equipment, Pacific Electric Railway Company, Los Angeles, Cal.

A. H. Gossard, Manager, Automotive Department, Middle West Utilities Company, Chicago, Ill.

W. H. Heun, General Manager, Chicago & Joliet Electric Railway Company, Joliet, Ill.

R. B. Hill, Manager of Transportation, Los Angeles Railway, Los Angeles, Cal.

R. T. Jackson, Superintendent, Visalia Electric Railroad Company, Exeter, Cal.

Walter Jackson, Consultant, Mt Vernon, New York.

H. E. Jordan, Superintendent Car Equipment, Los Angeles Railway Corporation, Los Angeles, Cal.

W. H. Lines, Vice-President, Pacific Northwest Public Service Company, Portland, Ore.

A. J. Lundberg, President, Key System Transit Company, Oakland, Cal.

J. A. Moon, Superintendent Transportation, San Diego Electric Railway Company, San Diego, Cal.

C. E. Morgan, President, The Cincinnati Car Corporation, Cincinnati, Ohio.

L. R. Nash, Vice-President Operating Division, Stone & Webster, Inc., Boston, Mass.

J. P. Potter, Vice-President Operation, Key System Transit Company, Oakland, Cal.

John H. Pritchard, Railway Engineer, Central Public Service Corporation, Chicago, Ill

Labert St. Clair, Advertising Director, American Electric Railway Association, New York, N. Y.

C. B. Short, General Manager, Roanoke Railway & Electric Company, Roanoke, Va.

O. A. Smith, Passenger Traffic Manager, Pacific Electric Railway Company, Los Angeles, Cal.

J. B. Stewart, Jr., General Manager, The Cincinnati Street Railway Company, Cincinnati, Ohio.

C. W. Stocks, Editor, *Bus Transportation*, New York, N. Y.

E. F. Thayer, Assistant to President, St. Louis Public Service Company, St Louis, Mo.

L. J. Turley, Electric Engineer, Los Angeles Railway, Los Angeles, Cal.

Claude L. Van Auken, Vice-President and Managing Editor, *Electric Traction*, Chicago, Ill.,

Paul E. Wilson, Vice-President and Secretary, The Cleveland Railway Company, Cleveland, Ohio.

SUMMARY INDEX OF PREVIOUS PROCEEDINGS

OF THE

AMERICAN STREET AND INTERURBAN RAILWAY TRANSPORTATION AND TRAFFIC ASSOCIATION, 1908-1910.

ADDRESS OF:	REPORT	PAGE
Allen, C. Loomis, President.....	1908	25
" " " "	1909	26
Todd, Robert I., President.....	1910	33
MEMBER COMPANIES AND THEIR TRANSPORTATION OFFI- CERS	1908	355
" " " " " "	1909	308
" " " " " "	1910	288
PAPERS READ AND DISCUSSED:		
"How Can a Small Road Best Promote Traffic and Increase Its Revenue," by Ernest Gonzenbach....	1908	47
"Carrying of United States Mail on Electric Rail- ways, Its Advantages and Disadvantages, and the Compensation Therefor," by C. H. Hile.....	1908	121
"Progress to Date in Carrying Freight and Express Matter by Electric Roads—Some Mistakes that Have Been Made and Their Remedy," by C. V. Wood	1908	179
Symposium: "The Possibilities of a Well-Conducted Publicity Department," papers by:		
Charles E. Flagg.....	1908	209
D. R. Stephens.....	1908	215
George Sabin Brush, Clerk.....	1908	222
George H. Gall.....	1908	227
Charles W. Lamb.....	1908	233
"Operation of Multiple Car Trains on Interurban Roads, The," D. F. Carver.....	1908	324
"Chicago's Transfer Crusade," by J. V. Sullivan..	1909	266
"Express and Freight Traffic on Interurban Lines," by S. L. Vaughan.....	1909	188
"Creation of Passenger Traffic," by John F. Keys....	1910	51
"Transfer Laws and Suggested Changes," by S. L. Hoffman	1910	221
"Use of Metal Tickets," by G. L. Radcliffe.....	1910	234
PORTRAITS OF PRESIDENTS:		
Allen, C. Loomis.....	1908	Frontispiece
Allen, C. Loomis.....	1909	"
Todd, Robert I.....	1910	"

	REPORT	PAGE
PROGRAM OF THE ANNUAL CONVENTION.....	1908	9
" " " " " ".....	1909	11
" " " " " ".....	1910	11
REMARKS BY:		
Ely, Hon. W. Caryl.....	1908	117
Beeler, John A.....	1909	25
MacAfee, John B.....	1910	75
REPORTS:		
City Rules	1908	343
" " " " " ".....	1909	198
" " " " " ".....	1910	183
CONSTRUCTION OF SCHEDULES AND TIME-TABLES.....	1910	245
Executive Committee	1908	40
" " " " " ".....	1909	29
" " " " " ".....	1910	36
Freight and Express.....	1908	173
" " " " " ".....	1909	171
" " " " " ".....	1910	175
Interurban Rules	1908	250
" " " " " ".....	1909	63
" " " " " ".....	1910	75
Nominations	1908	345
" " " " " ".....	1909	299
" " " " " ".....	1910	276
Organization Meeting	1908	29
Passenger Traffic	1908	330
" " " " " ".....	1909	35
" " " " " ".....	1910	47
Secretary-Treasurer	1908	46
" " " " " ".....	1909	32
" " " " " ".....	1910	43
Training of Transportation Employees.....	1908	74
" " " " " ".....	1909	275
" " " " " ".....	1910	237
Transfers and Transfer Information.....	1910	204

SUMMARY INDEX OF PREVIOUS PROCEEDINGS

OF THE

AMERICAN ELECTRIC RAILWAY TRANSPORTATION AND TRAFFIC ASSOCIATION, 1911-1929

ADDRESS OF:	REPORT	PAGE
H. C. Page, President.....	1911	37
J. N. Shannahan, President.....	1912	39
Dana Stevens, President.....	1913	11
D. Hegarty, President.....	1914	1
Mathew C. Brush, President.....	1915	1
H. A. Nicholl, President.....	1916	1
Luke C. Bradley, President.....	1919	46
W. H. Collins, President.....	1920	1
R. P. Stevens, President.....	1921	1
L. H. Palmer, President.....	1922	1
G. T. Seeley, President.....	1923	1
J. K. Punderford, President.....	1924	1
T. C. Cherry, President.....	1925	1
G. H. Clifford, President.....	1926	9
J. V. Sullivan, President.....	1927	12
Edward Dana, President.....	1928	1
W. H. Boyce, President.....	1929	1
MEMBER COMPANIES AND THEIR TRANSPORTATION		
OFFICERS	1911	550
" " " " " "	1912	421
PORTRAITS OF PRESIDENTS:		
H. C. Page.....	1911	Frontispiece
J. N. Shannahan.....	1912	"
Dana Stevens.....	1913	"
D. Hegarty	1914	"
Mathew C. Brush.....	1915	"
H. A. Nicholl.....	1916	"
L. C. Bradley.....	1919	"
W. H. Collins.....	1920	"
R. P. Stevens.....	1921	"
L. H. Palmer.....	1922	"
G. T. Seeley.....	1923	"
J. K. Punderford.....	1924	"
T. C. Cherry.....	1925	"
G. H. Clifford	1926	"
J. V. Sullivan.....	1927	"
Edward Dana	1928	"
W. H. Boyce.....	1929	"

	REPORT	PAGE
PROGRAM OF THE ANNUAL CONVENTION.....	1911	15
“ “ “ “	1912	15
“ “ “ “	1913	9
“ “ “ “	1914	ix
“ “ “ “	1915	x
“ “ “ “	1916	x
“ “ “ “	1919	viii
“ “ “ “	1920	viii
“ “ “ “	1921	ix
“ “ “ “	1922	ix
“ “ “ “	1923	ix
“ “ “ “	1924	ix
“ “ “ “	1925	xi
“ “ “ “	1926	ix
“ “ “ “	1927	ix
“ “ “ “	1928	viii
“ “ “ “	1929	vii

PAPERS READ AND DISCUSSED:

Address by:

Managing Director Gordon.....	1929	139
President Shannahan of American Association..	1925	62
President Sawyer of American Association....	1927	79
President Barnes of American Association....	1929	125

Address by Past Presidents:

L. C. Bradley	1925	69
L. H. Palmer	1925	72
G. T. Seeley.....	1925	73
“Application of Scientific Methods to Industrial Analyses,” by Francis Lee Dunham, M. D.....	1922	401
“Automobile Hazard, The,” by C. M. Talbert.....	1920	61
“Boat Line Co-ordination,” by S. L. Vaughan.....	1922	55
“Bus Operators’ School,” A Demonstration of the School of the Northern Ohio Power and Light Company for the Training of Operators.....	1927	96
“Cold Soup,” by J. S. Blecker.....	1924	97
“Company Publications, Their Preparation and Publication,” by Leake Carraway.....	1916	382
“Company Publications, Their Use and Value,” by F. W. Hild.....	1916	370
“Company Publications, Their Use and Value,” by T. S. Wheelwright.....	1916	378
“Competition and Rate Making,” by Philip Cahot....	1929	51
“Cost of Carrying a Passenger and the Proposed Work of the Bureau of Fare Research,” by Edwin Gruhl	1913	424
“Developing Favorable Public Sentiment,” by R. B.		

PAPERS READ AND DISCUSSED—Continued:	REPORT	PAGE
"Developing Summer Resort Business," by Harry B. Weatherwax	1922	73
"Development of Schedules Makers," by H. C. Donecker	1916	115
"Economies in Operation," by C. E. Morgan.....	1922	415
"Effect of Passenger Automobiles on Mass Transportation Traffic, The," by R. F. Kelker, Jr.....	1928	50
"Encouraging Auto Owners to Ride Cars," by A. Stuart Pratt	1922	39
"Forecasting the Future Growth and Development of a Community," by B. Bowman.....	1928	100
"Getting Increased Freight Business," by Frank D. Norviel	1922	421
"Getting Increased Passenger Business," by F. L. Butler	1922	418
"How Accidents May Be Prevented," by F. C. Henderschott	1914	182
"How I Made the By-Products, Pie and Hash, Pay," by W. R. Alberger	1922	21
"How to Increase Interurban Business," by F. W. Shappert	1922	28
"Increasing Freight Business," by F. C. Lewis.....	1922	34
"Increasing the Revenue of Interurban Roads," by Edward C. Spring.....	1922	100
"Interurban, The," by J. P. Griffin.....	1924	89
"It Can Be Done," by W. H. Sawyer.....	1924	87
"Jobs for Real Men; The Transportation Department and the Chance it Offers," by N. W. Bolen..	1914	394
"Latest Developments in Interurban Freight Business," by T. H. Stoffel.....	1925	15
"Light Weight Interurban Car, The," by J. P. Pope.	1922	306
"Making a Sales Asset of the State Committees on Public Utility Information," by J. S. S. Richardson	1926	48
"Making Safety Popular," by J. A. Van Osdol.....	1925	86
"Making Salesmen of Employes," by K. A. Simmon.	1922	50
"Maintenance of Men," by Hart E. Fisher.....	1923	214
"Meeting Bus Competition," by Victor S. Curtis....	1922	32
"Meeting Highway Competition," by D. W. Pontius.	1922	408
"National Issues in Local Street Railway Franchises," by Prof. Clyde L. King.....	1916	357
"Necessity of Departmental Co-operation, The," by H. A. Nicholl.....	1922	424
"New Mechanical Devices for the Prevention of Accidents," by M. H. Frank.....	1925	96
"New Method of Taking up Safety Work With Employes," by R. A. Sears.....	1926	101

Summary Index of Previous Proceedings

199

PAPERS READ AND DISCUSSED—Continued:

	REPORT	PAGE
"Newspaper Advertising," by W. P. Strandborg....	1924	101
"Obstruction of Street Traffic," by Lieut. John Martin	1922	146
"One-Man Prepayment Car Operation," by S. R. Inch	1912	401
"One-Man Safety Car, The," by E. M. Walker.....	1922	71
"Organization of Public Relations Departments," by L. K. Starr.....	1924	83
"Parking Problem, The," by F. H. Caley.....	1928	42
"Personnel and Training of Transportation Employees," by Dr. John Leeming.....	1921	202
"Picking Men for Jobs in the Transportation Department," by H. H. Norris.....	1921	207
"Plans for the 1912 Census of Electric Railways," by Wm. B. Steuart.....	1912	281
Playlet "Orders is Orders".....	1928	109
"Public Relations," by Harry Reid.....	1921	64
"Public Utility Sections of the Associated Advertising Clubs of the World," by W. H. Hodge.....	1924	104
"Relations between Manufacturer and Purchaser after the Purchase," by Charles H. Wondries.....	1928	136
"Regulations on Sanitation as Related to Public Carriers," by W. C. Rucker, M. D.....	1913	505
"Relation of a Merit System to Accident Prevention," by George B. Anderson.....	1924	22
"Relation of Electric Railways to Agriculture," by Paul Shoup	1915	174
"Resuscitation from Electrical Shock," by Dr. Hart E. Fisher	1925	109
"Safety and How to Make it Interesting to Mothers and Children," by Dwight Burroughs.....	1924	77
"Sickness and Accidents or Health and Safety," by Dr. W. M. Holtz.....	1925	119
"Selling to Your Employees," by Samuel Riddle.....	1922	43
"Selling Transportation," by W. L. Goodwin.....	1921	54
"Selling Transportation," by Edward Hungerford...	1922	91
"Selling Under a Zone System," by W. H. Boyce..	1922	24
"Some Essentials of Advertising," by Frank Le Roy Blanchard	1926	59
"Standardizing the House Organ of Electric Railways," by J. C. Davidson.....	1916	375
"State Public Service Information Committees," by J. S. S. Richardson.....	1924	94
"Statistical Units Used in Analysis of Electric Railway Accounts," by J. A. Emery	1913	403

PAPERS READ AND DISCUSSED— <i>Continued</i> :	REPORT	PAGE
"Street Car Service from a Woman's Point of View," by Mary A. Brennan	1929	120
"Successful Salesmanship," by E. M. Walker.....	1921	67
"Traffic Regulations in New York City," by In- specter John O'Brien.....	1921	94
"Traffic Regulations in the City of Rochester," by J. M. Quigley.....	1921	98
"Training Men for Supervisory and Executive Po- sitions," by Luke C. Bradley.....	1916	121
"Trainmen's Conference Demonstration," by em- ployees of the Atlantic City and Shore Railroad...	1929	28
"Transportation Personnel," by R. L. Wilson.....	1921	217
"Turnstile Car, The," by John E. Duffy.....	1922	317
"Turnstile Cars in New York City," by W. E. Thompson	1922	322
"Two-Car Train Operation for City and Suburban Travel," by C. J. Franklin.....	1911	515
"Utility Accidents to the Public Prevented Through School Safety Instruction," by Dr. E. Geo. Payne.	1921	131
"Value of Research in a Public Utility Industry, The," by Alexander Forward.....	1928	96
"Weekly Pass as a Profit Maker, The," by J. B. Stewart, Jr.....	1922	59
"What is Local Transportation News," by Louis Schyer	1926	54

REPORT OF:

Secretary-Treasurer	1911	51
"	1912	64
"	1913	32
"	1914	16
"	1915	20
"	1916	35
"	1919	45
"	1920	9
"	1921	10
"	1922	10
"	1923	11
"	1924	10
"	1925	13
"	1926	8
"	1927	10
"	1928	9
"	1929	8

REPORTS OF COMMITTEES:	REPORT	PAGE
Accident Prevention ..	1923	178
" " ..	1924	12
" " ..	1925	77
" " (Joint Committee).....	1926	131
Best Methods of Collecting and Accounting for Variable Rates of Fare.....	1913	418
Block Signals for Electric Railways (Joint).....	1911	221
" " " " " ..	1912	108
" " " " " ..	1913	175
" " " " " ..	1914	191
" " " " " ..	1915	83
" " " " " ..	1916	135
Board of Accident Prevention.....	1914	132
Bonus and Award Systems.....	1927	151
Bus Operation ..	1923	134
" " ..	1924	21
" " ..	1926	168
" " ..	1927	14
" " ..	1928	120
City Rules ..	1911	360
" " ..	1912	72
Claims Transportation ..	1915	196
" " ..	1916	78
Code of Traffic Principles.....	1919	53
" " " ..	1920	31
Collection and Registration of Fares.....	1919	151
" " " " ..	1920	10
Cooperation with the National Safety Council.....	1920	178
" " " " " " ..	1923	210
Cost of rush hour service.....	1916	264
Construction of Schedules and Time-tables.....	1911	500
" " " " " ..	1912	381
" " " " " ..	1913	446
" " " " " ..	1914	116
" " " " " ..	1915	42
" " " " " ..	1916	51
Development of New Business.....	1924	45
Economics of Schedules.....	1920	100
" " " ..	1921	146
Equipment, The ..	1929	72
Executive ..	1911	40
" ..	1912	42
" ..	1913	15
" ..	1914	5
" ..	1915	5
" ..	1916	10

REPORTS OF COMMITTEES—Continued:

	REPORT	PAGE
Executive	1919	1
“	1920	4
“	1921	5
“	1922	4
“	1923	4
“	1924	4
“	1925	4
“	1926	1
“	1927	6
“	1928	4
“	1929	4
Express and Freight Accounting (Joint)	1911	459
“ “ “ “ “	1912	284
Express and Freight Traffic	1911	443
“ “ “ “	1912	255
“ “ “ “	1913	375
“ “ “ “	1914	300
“ “ “ “	1915	211
“ “ “ “	1916	334
“ “ “ “	1920	127
“ “ “ “	1921	171
Fares and Transfers	1911	472
“ “ “	1913	335
“ “ “	1914	367
“ “ “	1915	266
“ “ “	1916	297
Fares and Transfers and Prepayment Car Operation	1912	206
Interurban Rules	1911	89
“ “	1912	89
Individual Membership	1913	38
Joint Use of Tracks and Terminal Facilities	1919	191
Merchandising Transportation	1920	141
“ “	1921	21
“ “	1922	16
“ “	1923	34
“ “	1926	11
Movement of the Vehicle	1929	11
Nominations	1911	538
“	1912	412
“	1913	514
“	1914	436
“	1915	303
“	1916	402
“	1919	222
“	1920	176

REPORTS OF COMMITTEES—Continued:

	REPORT	PAGE
Nominations	1921	196
“	1922	137
“	1923	117
“	1924	209
“	1925	204
“	1926	9
“	1927	11
“	1928	11
“	1929	9
One-Man Car Operation.....	1919	86
“ “ “	1922	274
“ “ “	1923	125
Passenger, The	1929	103
Passenger Traffic	1911	69
“ “	1912	246
“ “	1913	473
“ “	1914	336
“ “	1915	246
“ “	1916	88
Personnel and Training of Transportation Employees	1921	197
“ “ “ “ “ “	1922	334
Relief of Traffic Congestion.....	1924	183
Resolutions	1911	538
“	1912	411
“	1913	513
“	1914	435
“	1915	305
“	1916	402
“	1919	221
“	1920	175
“	1921	222
“	1922	454
“	1925	202
“	1926	220
“	1927	199
“	1928	154
“	1929	151
Rules	1913	39
“	1914	19, 115
“	1915	23
“	1916	368
Safety Car Operation.....	1920	7
Safety Work	1921	106
“ “	1922	164
Service Betterment	1927	160
“ “	1928	67

REPORTS OF COMMITTEES—Continued:	REPORT	PAGE
Small City, The	1920	49
Standards	1915	185
“	1916	36
Statistical Unit for Car Operation.....	1912	322
“ “ “ “ “	1913	402
Subjects	1911	56
“	1912	49, 71
“	1915	8
“	1916	14
“	1919	3
“	1922	5
Selling Transportation	1925	161
Trackless Vehicle Operation.....	1924	108
Traffic and Safety.....	1927	110
“ “	1928	13
Traffic Congestion	1925	138
“ “	1926	68
Traffic Regulations	1921	85
“ “	1922	139
“ “	1923	14
Training of Transportation Employees.....	1911	57
“ “ “ “	1912	331, 365
“ “ “ “	1913	428
“ “ “ “	1914	409
“ “ “ “	1915	285
Train Operation	1912	224
City Service	1913	283
Interurban	1913	322
Transportation Employee	1929	142
Transportation-Engineering	1916	241
Uniform Definitions	1912	106
“ “	1913	463
“ “	1914	402
“ “	1915	75
“ “	1916	109

GENERAL INDEX

	PAGE
Accident hazard, the.....	58
Accident prevention, training from the standpoint of, including group conference training methods, job analysis, etc., studied by Committee on The Transportation Employee.....	7
Accident proneness of trainmen, study of made by Committee on The Transportation Employee.....	4, 13
Address of the President.....	1
<i>Aera</i> , report of the Committee on Nominations to be printed in issue of, preceding convention.	6, 9
Anderson, George B.: Address of the President read by.....	1
Automobile registration, discussion of.....	28
Automobile registrations and their effect upon the riding habit, suggested for work of Committee on The Movement of the Vehicle	4, 7
Bus service, a proposed method of distribution of cost to routes and classes of.....	122
Bus stops	54
Bus substitution	83
Buses: Accessories necessary for the safe and convenient operation of.	180
Comparison of costs on various sizes of.....	176
Substitution of, for street cars.....	111
Butler, F. L.: Discussion of report on Small City Operation.....	85
Cars, new and rehabilitated, effect on revenue and operating ex- penses of	163
Committee on, <i>see</i> following headings: Convention Program. The Equipment. The Movement of the Vehicle. Nominations. Operating Economics. The Passenger. Small City Operation. The Transportation Employee.	
Committees, personnel of.....	vi
Competition	83
Conductor, proper contact of the, study of to be made by Com- mittee on The Transportation Employee.....	4
Contents, table of.....	iii
Contributors to discussions.....	192
Convention program	vii

	PAGE
Convention Program, Committee on:	
Personnel of	vi
<i>See also</i> Executive Committee, report of.	
Cost accounting analysis by lines, cooperation with the Accountants' Association in further developing a system of.....	120
Cost analysis methods:	
Desirability of collaboration between the Accountants' and the Transportation and Traffic Associations in completing study of	6
Subcommittee on Bus Accounting of the Standard Classification of Accounts Committee of the Accountants' Association, designated to cooperate in a joint study of.....	8
Discussions, contributors to.....	192
Economics of street railway operation, suggestion for appointment of committee to study.....	5
Editing Proceedings, Committee on, discontinued.....	5
Electric railway service, a proposed method of distribution of revenues and expenses to routes and classes of.....	126
Employees:	
Training of	16
Transportation, selection of.....	15
The Equipment, Committee on:	
Discussion of report of.....	183
Personnel of	vi
Report of	162
Accessories necessary for the safe and convenient operation of buses and trolley buses.....	180
Effect on revenue and operating expenses of new or rehabilitated cars ...	163
Size, type and character of units most suitable for various classes of service.....	175
<i>See also</i> Executive Committee, report of.	
Executive Committee:	
Personnel of, (1929-1930) iv; (1930-1931).....	v
Report of	3
Accident proneness of trainmen, study of to be made by Committee on The Transportation Employee.....	4
Committee activities, <i>see</i> Committee on.	
Committee on:	
Convention Program:	
Letter, suggesting names of discussioners read....	9
Suggestions of, that there be fewer luncheon conferences; that subjects being studied by the Transportation and Traffic Association be not chosen for luncheon conferences.....	6
Tentative program outlined by chairman of.....	8

Executive Committee, (Continued).

Report of (Continued)

Committee on (Continued)

Editing Proceedings	PAGE
Discontinued	5
The Equipment:	
Bus Accounting Subcommittee of the Standard Classification of Accounts Committee of the Accountants' Association designated to cooperate with in a joint study of cost analysis methods..	8
Chairman to outline plan for work of, prior to meeting of	7
Continued	4
Engineering members of.....	4
Report of to be printed for advance distribution..	8
To be a joint committee with the Engineering Association considered	4
The Movement of the Vehicle:	
Auto registrations and their effect upon the riding habit, suggested for work of.....	7
Continued	4
Parking regulations studied for purpose of making recommendations on	6
Report of, to be printed for advance distribution..	8
Nominations:	
Appointment of	8
Report of, to be published in issue of <i>Aera</i> preceding convention	6, 9
Operating Economics:	
Appointment of, to study economics of street railway operation from the standpoint of the practical operator or manager.....	5
Meeting called to outline work of.	6
Outline of work accomplished.....	8
Report of, to be printed for advance distribution..	8
The Passenger:	
Employment of a market analysis expert:	
Approved by Executive Committee of Transportation and Traffic Association.....	4
Disapproved by Executive Committee of American Association	8
Referred to Policy and Finance Committees..	5
Progress report to be printed for advance distribution	8
Work of for year, depends on whether a specialist is employed for making market analysis.....	7

Executive Committee (Continued):

Report of (Continued)

Committee on (Continued)

Small City Operation:

PAGE

Business surveys, made by students of public utility courses of Harvard and other universities.. 7

Chairman of, calls attention to desirability of business surveys 7

Personnel of, to be continued. 3

Report of:

Approved by Executive Committee. 9

Submitted to American Association for a decision as to whether or not it be printed in the Proceedings of either the American or the Transportation and Traffic Association Proceedings 9

Return on new capital invested and results obtained with various fare systems in use, attention of given to. 7

Spurr, A. C., appointed as member of. 6

Subcommittee on procedure appointed. 7

Suggestion that member of headquarters' staff be appointed to work in cooperation with. 3, 4, 5

To be presented at luncheon conference of American Association 9

Universities to be asked, that students make surveys of small city properties, as part of public utility studies 7

Subjects:

For 1931 work to be appointed after convention.. 9

Report of 3

The Transportation Employee:

Investigation of accident proneness among trainmen and study of instruction and proper contact of the conductor, suggested for work of.. 4

Report of, to be printed for advance distribution.. 8

To be continued. 4

Training from the standpoint of accident prevention, including group conference training methods, job analysis, etc., special study of, given to by 7

Committee organization:

Completed 5

Suggestion for appointment of committee to study economics of street railway operation from the standpoint of the practical operator or manager. 5

Executive Committee (*Continued*).

Report of (<i>Continued</i>)	PAGE
Committee reports, secretary instructed to notify committee chairmen of final day which reports must be in..	8
Conductor, proper contact of the, study of to be made by Committee on The Transportation Employee.....	4
Correspondence, chairman and sponsors to send copies of, to Executive Committee members... ..	7
Cost analysis methods·	
Bus Accounting Subcommittee of the Standard Classification of Accounts Committee of the Accountants' Association designated to cooperate in a joint study of	8
Desirability of collaboration between the Accountants' and Transportation and Traffic Associations in completing study of... ..	6
Officers, election of, day for changed.....	6
Schaeffer prone pressure method of resuscitation, recommendation that American Executive Committee approve, favorably acted upon.... ..	5
Traffic control and parking in relation to accident prevention studied for purpose of making recommendations on.	7
Fare systems, results obtained with various, studied by Committee on Small City Operation.....	7
Fares, <i>see</i> Operating Economics, Committee on.	
Franchises	83
Holden, W. W.	
Presentation of report of Committee on The Passenger, by....	144
Index, <i>see</i> summary index.	
Jordan, H. E.:	
Discussion of report on Operating Economics.....	131
Luncheon conferences, suggestion that there be fewer.....	6
Lundberg, A. J.:	
Discussion of report on The Movement of the Vehicle.....	77
Market analysis plan.....	142
McIlraith, E. J.:	
Discussion of report on The Movement of the Vehicle.....	63
Mercier, A. T.:	
Discussion of report on:	
Operating Economics	131
The Transportation Employee.....	21
The Movement of the Vehicle, Committee on:	
Discussion of report of, by:	
McIlraith, E. J.....	63
Lundberg, A. J... ..	77
Personnel of	vi

The Movement of the Vehicle, Committee on (<i>Continued</i>):	PAGE
Report of	27
Automobile registration	28
Equipment	60
Foreword	27
Parking problem	42
Private automobile.....	28
Signals and traffic control.....	55
<i>See also</i> Executive Committee, report of.	
Nominations, Committee on:	
Personnel of	vi
Report of	ii
<i>See also</i> Executive Committee, report of.	
Norris, Henry H.:	
Discussion of report on The Transportation Employee.....	19
Officers (1929-1930), iv; (1930-1931).....	v
Officers:	
Election of	12
Installation of	191
<i>See also</i> Executive Committee, report of.	
One-man cars, use of.....	109
Ong, Joe R.:	
Letter from regarding section of report of Committee on Operating Economics	126
Operating Economics, Committee on:	
Appendix to report of.....	122
A proposed method of distribution of cost to routes and classes of bus service.....	122
A proposed method of distribution of revenues and ex- penses to routes and classes of electric railway service..	126
Discussion of report of, by:	
Jordan, H. E.....	131
Mercier, A. T.....	135
Turley, L. J.....	134
Van Auken, Claude L.....	128
General discussion of report of.....	129, 137
Personnel of	vi
Report of	103
Business getting	115
Cooperation with the Accountants' Association in further developing a system of cost keeping analysis by lines..	120
Letter from Joe R. Ong, regarding.....	126
Fares	116
One-man cars, use of.....	109
Operating Practices	104
Substitution of buses for street cars.....	111
<i>See also</i> Executive Committee, report of.	
Operating Practices	104

Parking .	PAGE
Control in relation to accident prevention studied..	7
Regulations studied by Committee on The Movement of the Vehicle	6
The Passenger, Committee on:	
Discussion of report of.	147
Personnel of	vi
Presentation of report of, by W. W. Holden.	144
Report of	141
Market analysis plan.. . . .	142
See also Executive Committee, report of	
Peak hour prohibition.	53
Personnel of Committees.	vi
President, address of.	I
Program of the Convention.. . . .	vii
Riddle, Samuel, telegram from.	I
Riding comfort	41
Routing, selection of.	42
Schaeffer prone pressure method of resuscitation, recommendation that American Executive Committee approve, favorably acted upon	5
Secretary-Treasurer, report of.	9
Service improvement, job analysis a requisite for.	17
Signals and traffic control.	55
Small City Operation, Committee on:	
Discussion of report of, by F. L. Butler.	85
General discussion of report of.	86
Personnel of	vi
Report of.	81
Bus substitution	83
Competition	83
Financial structure	84
Franchises	83
Merchandising	82
Operating Economics	84
Taxes	84
See also Executive Committee, report of.	
Speed, see Movement of the Vehicle, Committee on.	
Street Cars, substitution of buses for.	111
Subjects, Committee on, see Executive Committee, report of.	
Summary index to previous Proceedings:	
American Electric Railway Transportation and Traffic Association	196
American Street and Interurban Railway Transportation and Traffic Association	194
Taxes	84
Taxicab stands	54
Terminal convenience	41

